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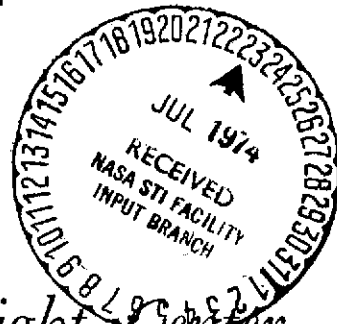
Skylab



MSFC SKYLAB MISSION SEQUENCE EVALUATION
Skylab Program Office

NASA

*George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama*



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16. ABSTRACT Planned and actual major Skylab sequences are presented. Off-nominal events are highlighted. Differences between planned and actual events are discussed.			
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ABBREVIATIONS

ACT	Activation
ALIGN	Alignment
AM	Airlock Module
AMS	Articulating Mirror System
APCS	Attitude Pointing Control System
ATM	Apollo Telescope Mount
BMMD	Body Mass Measurement Device
B/O	Bake Out
CALROC	Calibration Rocket
CBRM	Charger Battery Regulator Module
C&D	Control & Display
CDR	Commander
CIRC	Circulation
C/L	Checklist
CM	Command Module
CMG	Control Moment Gyro
C/O	Check Out
CPG	Counter Pressure Garment
CSM	Command & Service Module
C&W	Caution & Warning
DC	Digital Computer
DCS	Digital Command System
DEACT	Deactivation
DOY	Day of Year
DTO	Detailed Test Objective
ECS	Environmental Control System
EDDV	EREP Downlink Diagnostic Unit

ABBREVIATIONS (Continued)

EPC	Experiment Pointing Control
EPEA	Experiment Pointing Electronics Assembly
EPS	Electrical Power System
EREP	Earth Resources Experiment Package
ETC	Earth Terrain Camera
EXP	Experiment
EVA	Extra Vehicular Activity
FMU	Force Measuring Unit
FSCP	Fire Sensor Control Panel
GDC	Gyro Display Coupler
GG	Gravity Gradient
GMT	Greenwich Mean Time
G&N	Guidance and Navigation
HR	Hour
IMSS	Inflight Medical Support System
IU	Instrument Unit
I&C	Instrumentation and Communication
JSC	Johnson Space Center
LIOH	Lithium Hydroxide
MD	Mission Day
MDA	Multiple Docking Adapter
MIN	Minute
MS	Molecular Sieve
MSET	Mission Sequence Evaluation Team
MSFC	Marshall Space Flight Center
OBS/CWG	Operational Biomedical Harness/Constant Wear Garment
OPS	Operations
OWS	Orbital Workshop

ABBREVIATIONS (Continued)

PCG	Power Conditioning Group
PGA	Pressure Garment Assembly
PH	Personal Hygiene
PRD	Personal Radiation Dosimeter
PREPS	Preparations
PSIA	Pounds per Square Inch Absolute
PT	Physical Training
QD	Quick Disconnect
QUAD	Quadrant
RCS	Reaction Control System
RSS	Refrigeration Subsystem
SAL	Scientific Airlock
SAS	Solar Array System
SIA	Speaker Intercomm Assembly
SL	Skylab
SM	Service Module
SMMD	Specimen Mass Measurement Device
SN	Serial Number
SOP/SOMA	Secondary Oxygen Pack/Secondary Oxygen Mask Assembly
SPS	Service Propulsion System
STS	Structural Transition Section
SWS	Saturn Workshop
SYS	System
TACS	Thruster Attitude Control System
TCS	Thermal Control System
UCTA	Urine Container/Transfer Assembly

ABBREVIATIONS (Concluded)

W	Watt
WMC	Waste Management Compartment
VABD	Van Allen Belt Dosimeter
VHF	Very High Frequency
UTS	Viewfinder/Tracking System
XFERS	Transfers
Z-LV	Z-Local Vertical

INTRODUCTION

This report contains: 1) a description of the various phases of the Skylab missions and how they interrelate, 2) sequences of the planned major events and the actual major events/anomalies, and 3) brief narratives describing the differences between planned and actual sequences.

Figures 1 and 2 present overviews of the planned and actual Skylab program, respectively. The times for major events are shown at the top of the figures in Day of Year:Hour:Minute Greenwich Mean Time. The major mission phases are shown in bar chart form. Data for this report have been compiled by the Mission Sequence Evaluation Team (MSET) from as-flown flight plans, mission status reports, command tracking data, processed flight data, crew voice transcripts, and real time network monitoring. Information was also obtained from MSFC Mission Support Group personnel, MSFC Technical Discipline Managers, the MSFC Flight Evaluation Working Group, and JSC Mission Evaluation Room personnel. Detailed event times may be found in the Skylab Mission Events List, 25M00700 (also compiled by the MSET), available in the MSFC Documentation Repository. Skylab systems evaluation details may be found in the following NASA Technical Memoranda.

TMX-64808	MSFC Skylab Final Program Report
TMX-64809	MSFC Skylab Corollary Experiments Final Technical Report
TMX-64810	MSFC Skylab Airlock Module Final Technical Report
TMX-64811	MSFC Skylab Apollo Telescope Mount Final Technical Report
TMX-64812	MSFC Skylab Multiple Docking Adapter Final Technical Report
TMX-64813	MSFC Skylab Orbital Workshop Final Technical Report
TMX-64814	Skylab Mission Report-Saturn Workshop
TMX-64815	MSFC Skylab Apollo Telescope Mount Summary Mission Report
TMX-64817	MSFC Skylab Attitude & Pointing Control System Mission Evaluation Report
TMX-64818	MSFC Skylab Electrical Power System Mission Evaluation Report
TMX-64819	MSFC Skylab Instrumentation & Communication System Mission Evaluation Report
TMX-64820	MSFC Skylab Corollary Experiments Systems Mission Evaluation Report
TMX-64821	MSFC Skylab Apollo Telescope Mount Experiment Systems Mission Evaluation Report
TMX-64822	MSFC Skylab Thermal & Environmental Control System Mission Evaluation Report
TMX-64823	MSFC Skylab Apollo Telescope Mount Thermal Control System Mission Evaluation Report
TMX-64824	MSFC Skylab Structures & Mechanical Systems Mission Evaluation Report
TMX-64825	MSFC Skylab Crew Systems Mission Evaluation Report
TMX-64826	MSFC Skylab Contamination Control Systems Mission Evaluation Report

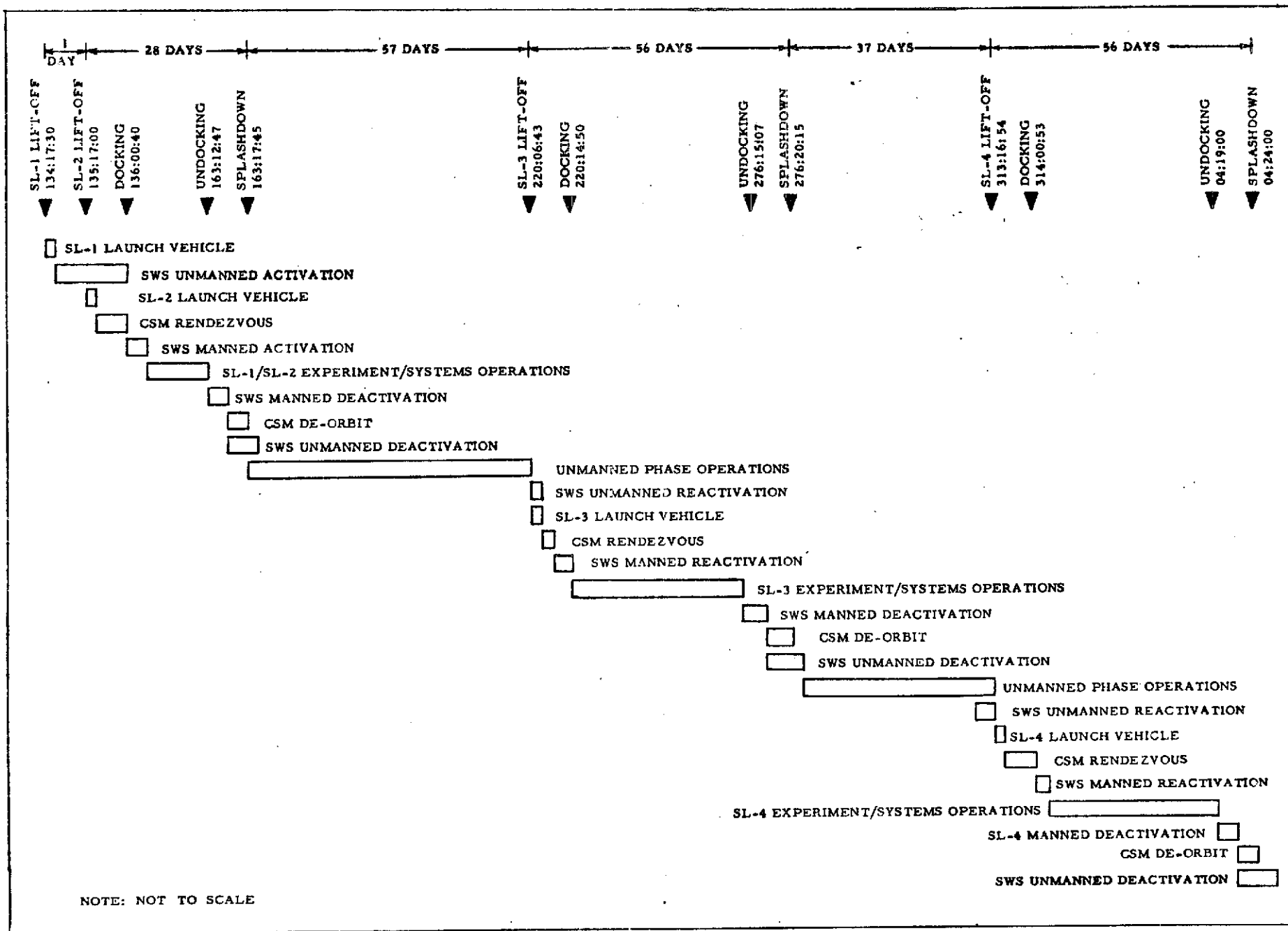


FIGURE 1. SKYLAB PROGRAM SUMMARY - PLANNED

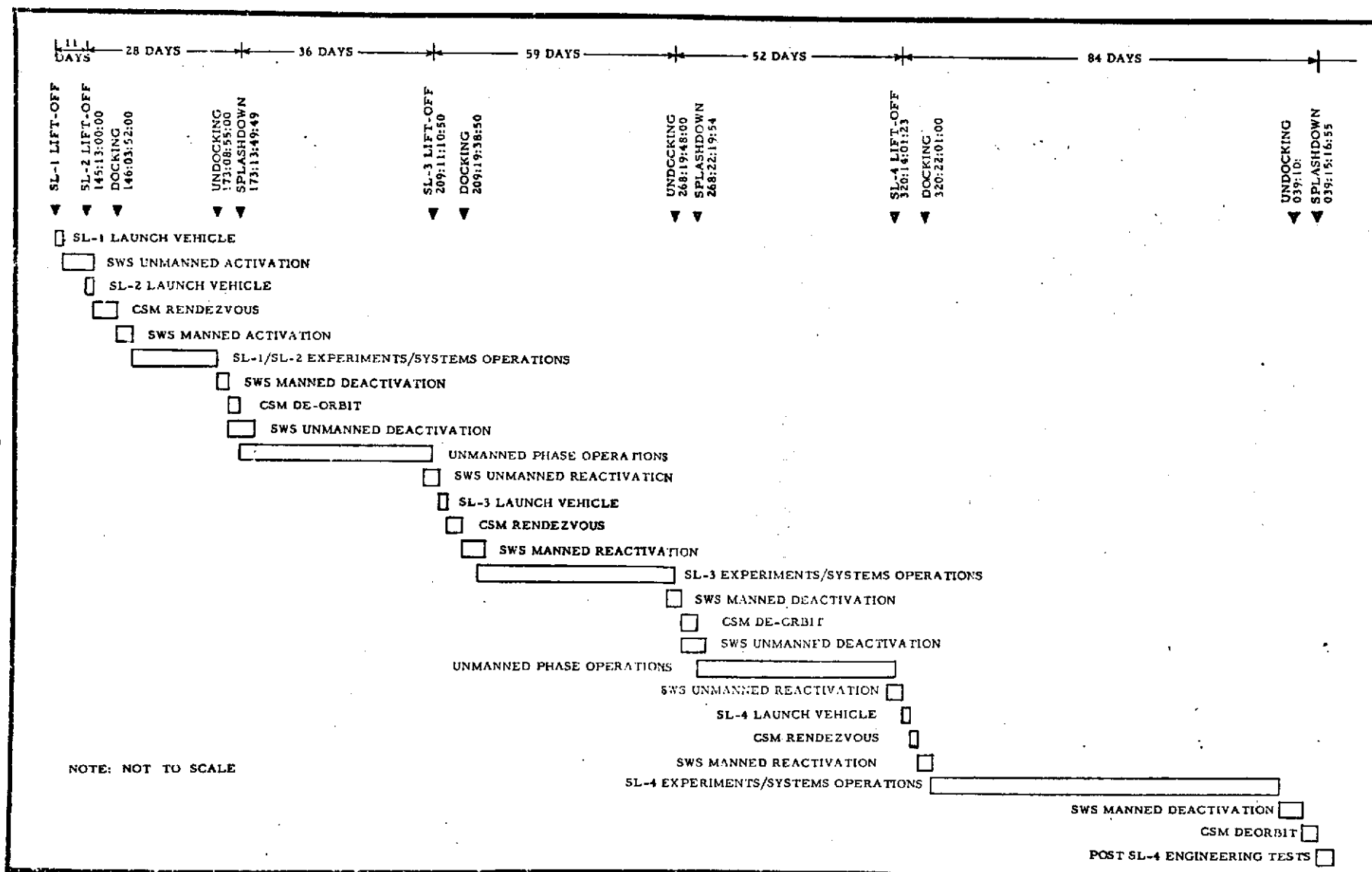


FIGURE 2. SKYLAB PROGRAM SUMMARY - ACTUAL

SL-1/SL-2

Figures 3 and 4 present the planned and actual SL-1/SL-2 mission events. Planned refers to pre-mission planning as described in the SL-1/SL-2 Final Skylab Flight Plan (May 14, 1973 launch) dated April 11, 1973. The two major differences between the planned and actual sequences were as follows:

- a. The loss of the OWS meteoroid shield, the loss of one OWS solar wing, and the failure of the other OWS solar wing to deploy completely, resulted in the SL-2 launch being delayed 10 days.
- b. An additional EVA was required to deploy the remaining OWS SAS wing.

The major mission phases and the effect of the meteoroid shield, solar array, and other anomalies, are discussed in more detail in subsequent sections of this report.

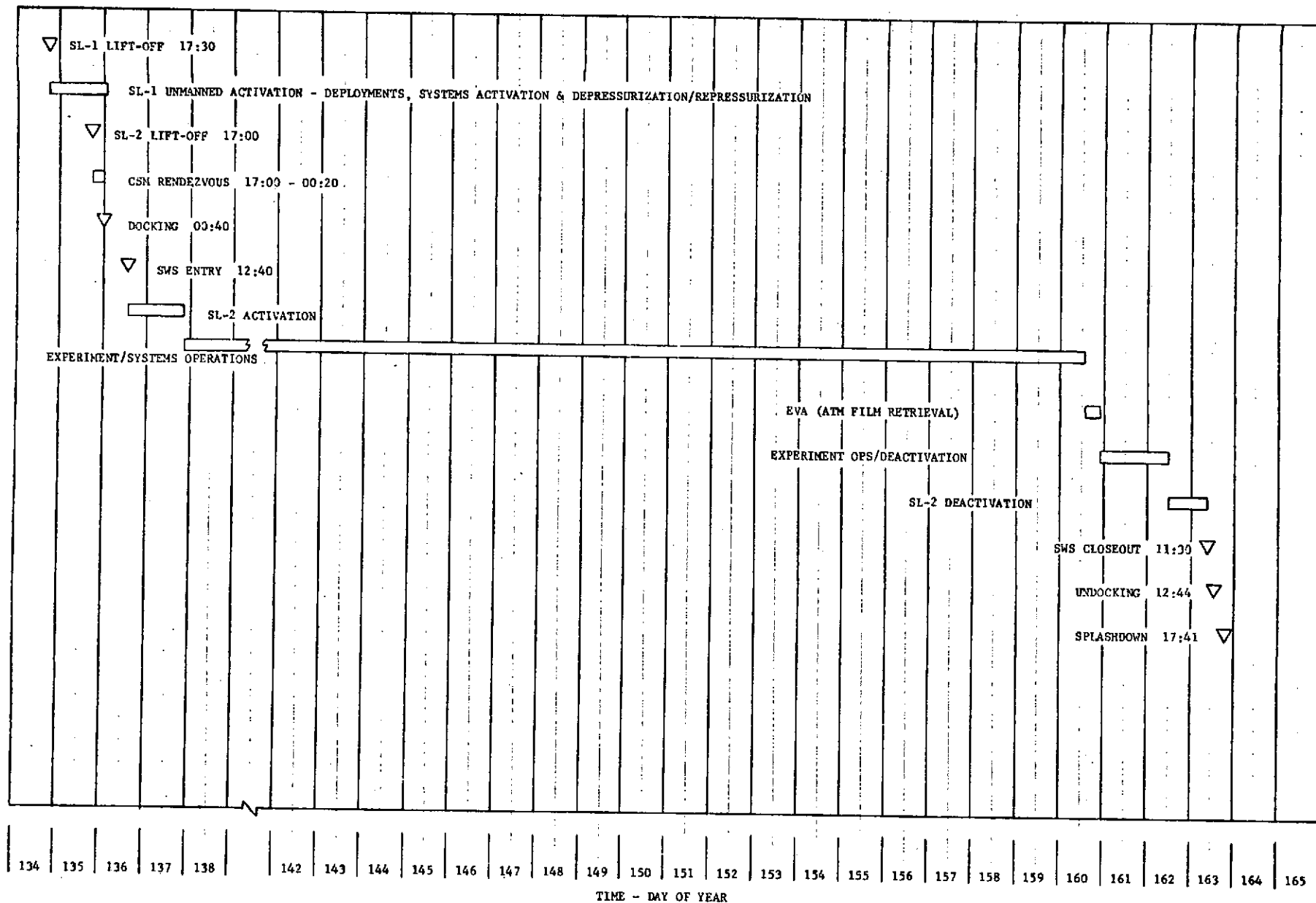


FIGURE 3. SL-1/SL-2 SUMMARY - PLANNED

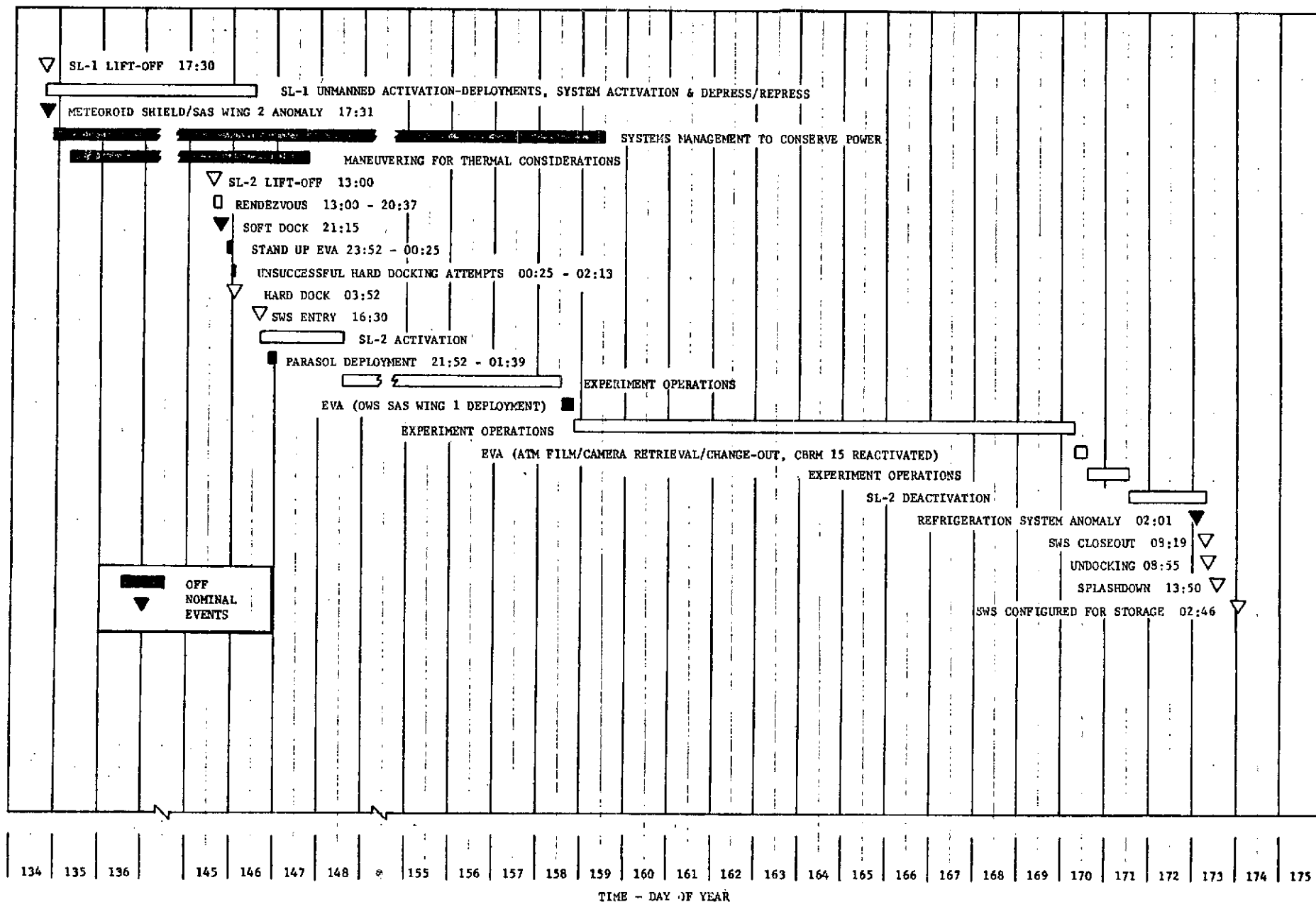


FIGURE 4. SL-1/SL-2 SUMMARY - ACTUAL

SL-1/SL-2 ACTIVATION

The planned and actual SL-1 unmanned activation sequences are shown in Figures 5 and 6 , respectively. The differences in the two sequences were a result of the OWS meteoroid shield anomaly shortly after lift-off. Since the meteoroid shield was also to have performed a thermal control function, the loss of the shield resulted in high OWS temperatures. The meteoroid shield failure also caused the loss of one OWS solar array wing and prevented the complete deployment of the remaining wing, resulting in an SWS power shortage.

The launch of SL-2 was then delayed for 10 days while the status of the SWS was assessed, a sun shade built, and the SL-2 CSM fuel cells "topped up" to help the power situation. During this 10-day period the SWS was maneuvered periodically to lower the OWS temperature. The pressurization and depressurization sequences were also revised to remove possible contaminants caused by the high temperatures.

SWS systems were managed continually to conserve power. MDA heaters, the AM Digital Command System, and the AM Real Time Telemetry System, for example, were cycled on/off or to reduced power usage configurations. The electrical power systems were also managed to prevent excessive discharge of any of the batteries.

The planned and actual SL-2 activation sequences are shown in Figures 7 and 8 , respectively. The two major problems, high OWS temperatures and a general SWS power shortage, still existed at SL-2 lift-off. After rendezvousing with the SWS

the crew performed a flyaround maneuver to inspect the condition of the SWS in general and the partially deployed OWS solar array wing in particular. A standup EVA from the CSM to deploy the solar array wing was unsuccessful.

During their first full day of activation the crew deployed a sun shade, or parasol, through the OWS solar Scientific Airlock. Following parasol deployment the OWS temperatures decreased to an acceptable level.

Although the OWS temperatures had decreased, the power shortage still existed. Systems management was continued and crew activities were limited to conserve power. The crew deployed the solar array wing during the EVA on DOY 158 (Mission Day 14), and near nominal mission operations began shortly thereafter.

Other observations concerning the SL-1/SL-2 activation are as follows:

- (1) For planning purposes the SL-1 IU lifetime was assumed to be 7-1/2 hours; however, the IU lasted approximately 18 hours. A more realistic estimate of the IU life would have been desirable for planning purposes and might have significantly altered the planned SL-1 unmanned activation sequence.
- (2) The crew made a number of unsuccessful docking attempts with the SWS. This delayed activation by a short time and required a significant amount of TACS propellant to stabilize the SWS.
- (3) APCS rate gyro problems occurred early in the activation sequence. These problems caused additional TACS usage and resulted in a shortage of TACS propellant because of the large number of unplanned maneuvers.

In general, the effect of the meteoroid shield anomaly was to delay the beginning of a near-nominal experiment performance mission by approximately 24 days (a 10-day SL-2 launch delay plus 14 days of reduced crew activities until after the EVA solar array deployment). Possible long-term effects included OWS system degradation due to the initial high temperature environment, AM/MDA system degradation due to initial low temperature environment, a shortage of TACS propellant, and generally all systems degradation because of increased cycling and off-nominal operating configurations.

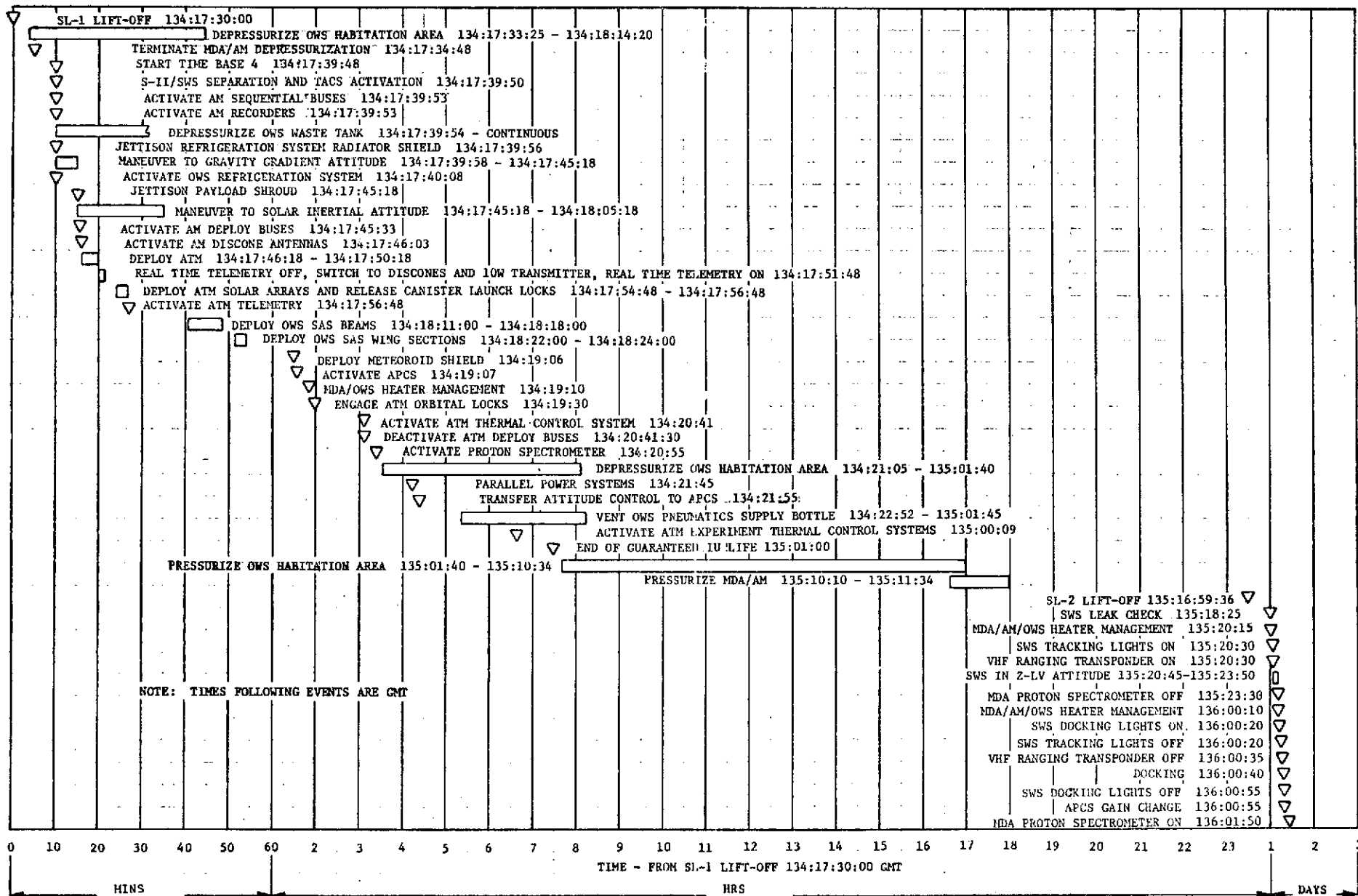


FIGURE 5. SL-1 UNMANNED ACTIVATION - PLANNED

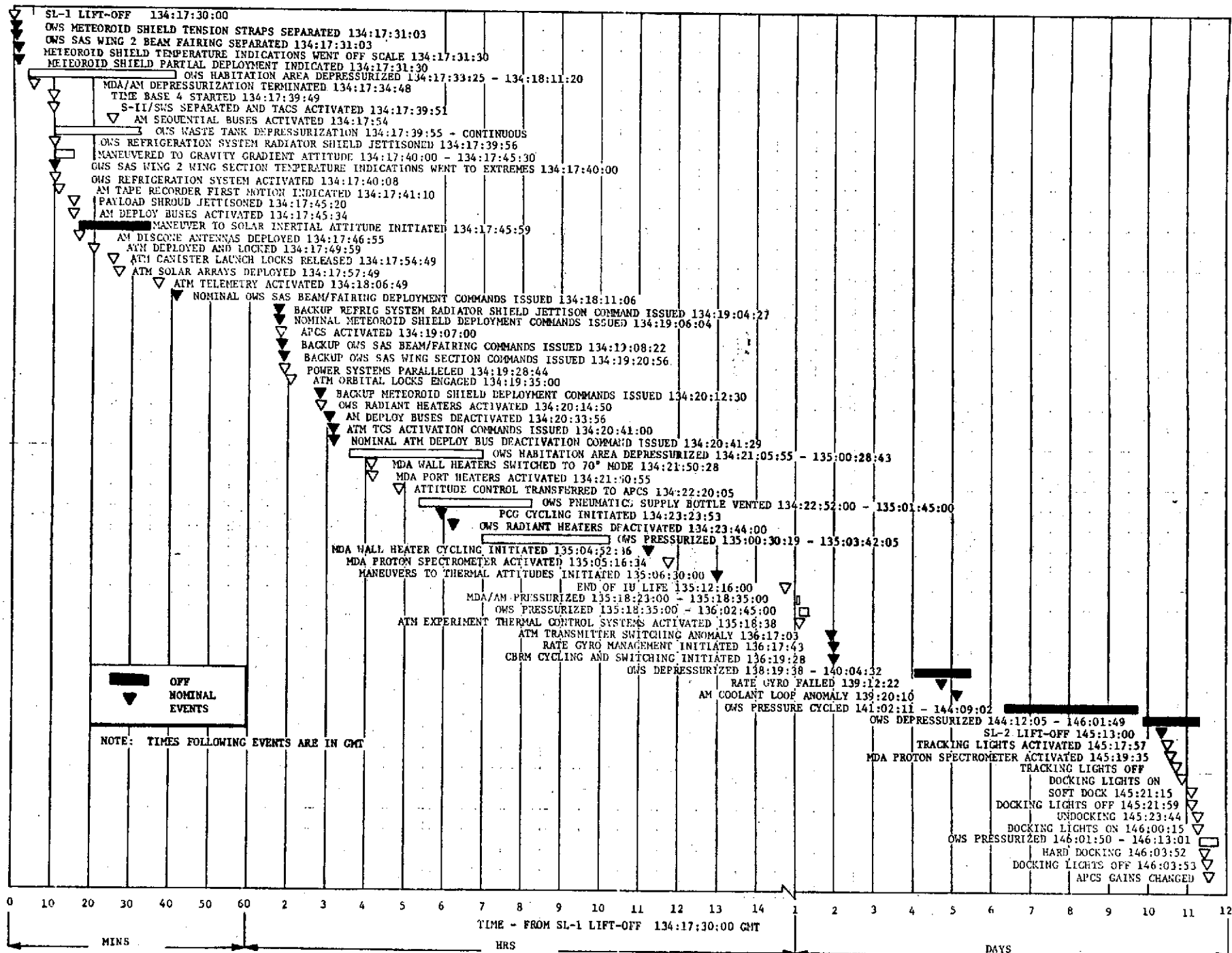


FIGURE 6. SL-1 UNMANNED ACTIVATION - ACTUAL

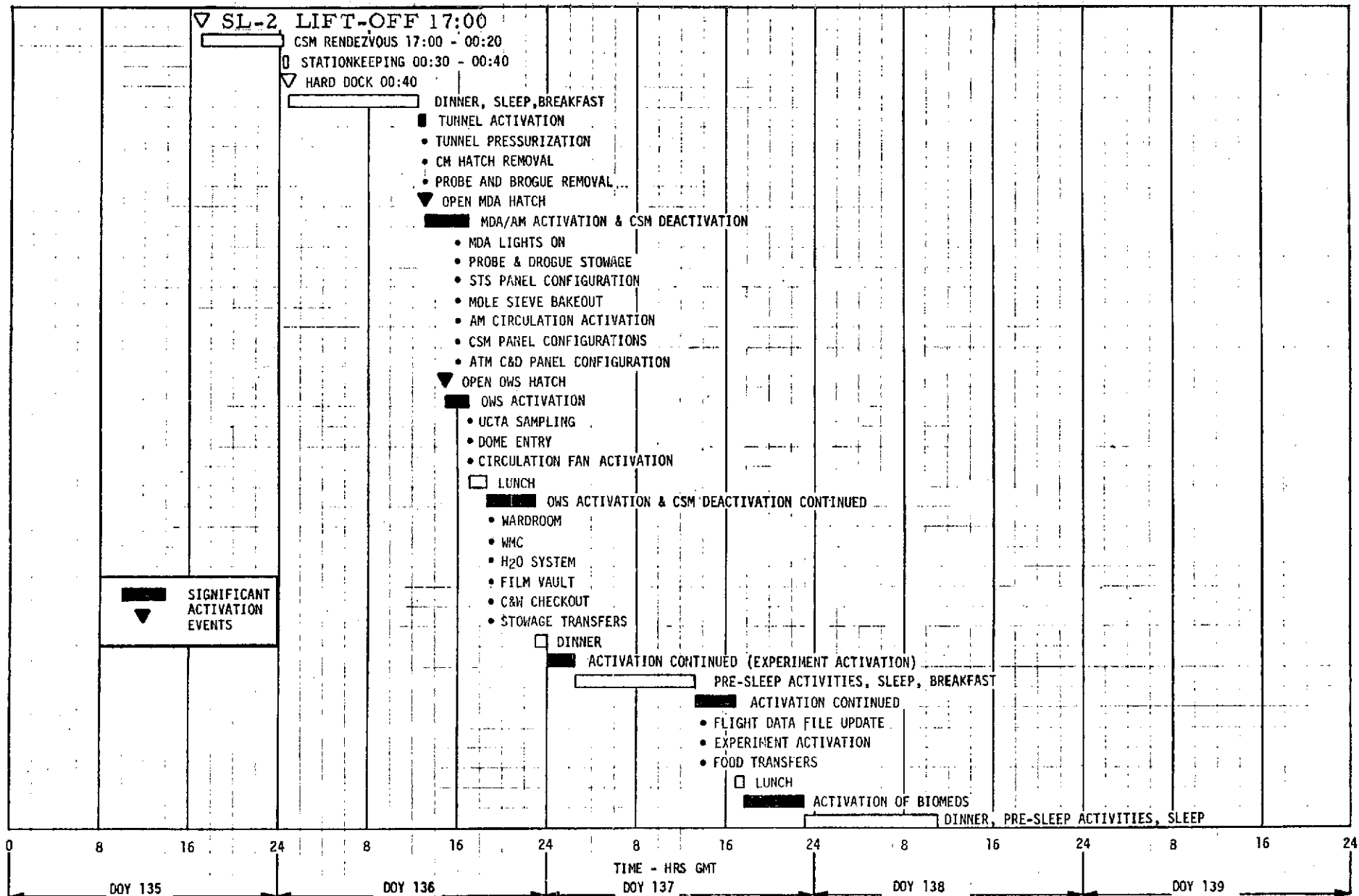


FIGURE 7. SL-2 ACTIVATION - PLANNED

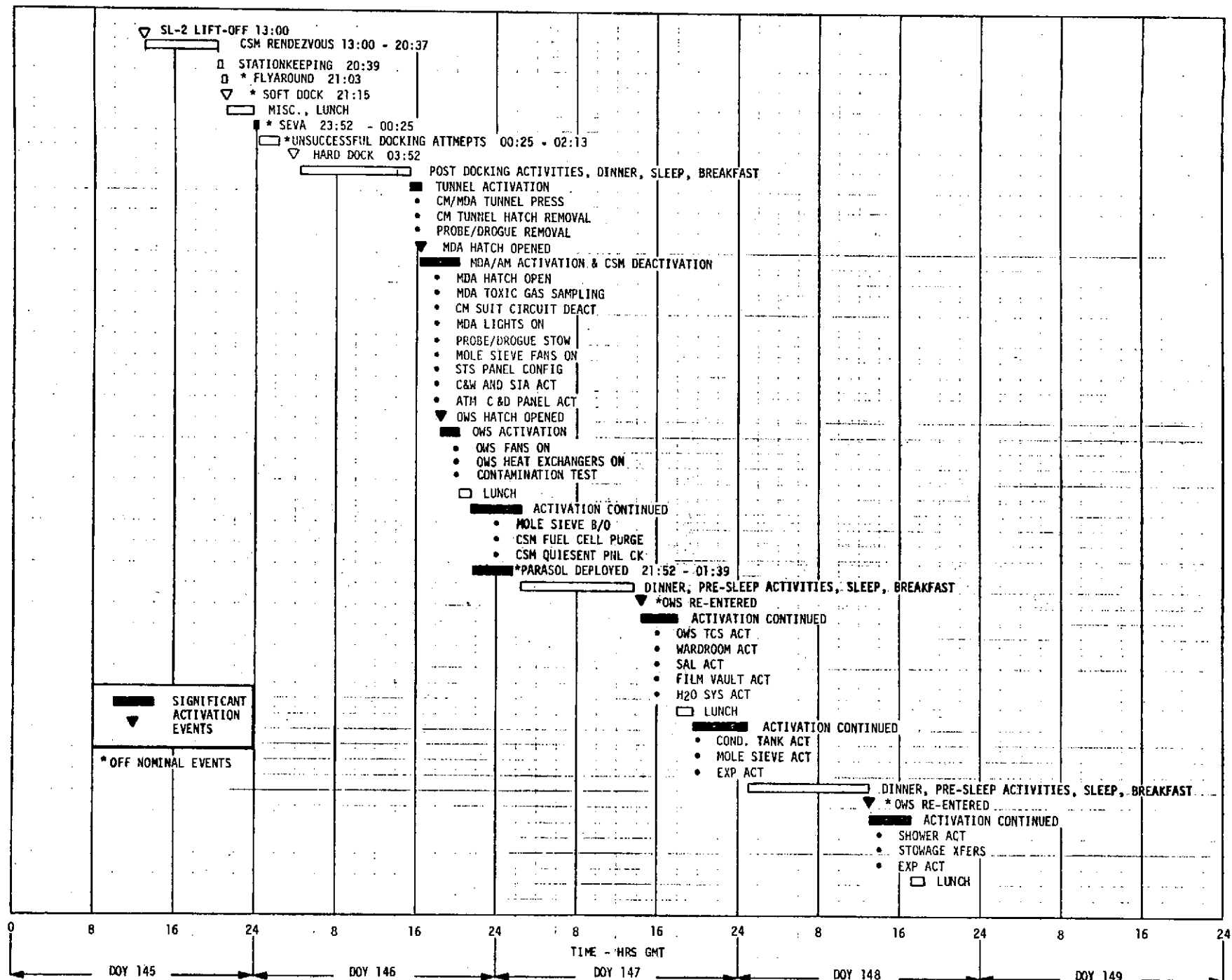


FIGURE 8. SL-2 ACTIVATION - ACTUAL

SL-2 EXPERIMENT/SYSTEMS OPERATIONS

Table 1 shows the experiment operations and crew activities on a daily basis. Remarks are also included to explain an activity or note an anomaly. In general, experiment operations were nearly nominal. However, a number of experiments could not be performed since the OWS Solar SAL was occupied by the parasol.

The actual sequence for EVA #1 (DOY 158) is shown in Figure 9. No planned sequence is included since this was not a regularly scheduled EVA.

The planned and actual EVA sequences for the second (first planned) EVA are shown in Figures 10 and 11, respectively. The time required and the sequence of activities for both the planned and actual EVA's was similar although some time was spent on the CBRM malfunction procedure and ATM camera change-out. These tasks were not planned.

TABLE 1. SL-2 EXPERIMENT/SYSTEMS OPERATIONS

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
1/145	Launch, Rendezvous ¹ , Fly Around, Standup EVA ² D008, M415	1. Real Time TV coverage 2. Effort failed to deploy OWS SAS Wing 1
2/146	M071/M073, D008 AM/MDA activation, parasol deployed thru Solar SAL ¹	1. Real Time TV coverage General: Crew slept in CM
3/147	OWS Activation M071/M073, M074 activation D008 ATM Power up by ground	General: a. Fire Sensor False alarm sounded b. Crew slept in MDA
4/148	OWS activation completed ATM (unattended checkout) CSM Trim Burn M071/M073, M074 ¹ , M172 calibration ² , M092/M093/M171, T003, D008, M151, Van Allen Belt Dosimeter (VABD) Reading, Personal Radiation Dosimeter (PRD) Reading, CSM Spectrometer Reading	1. Calibration of wardroom SMMD only. Failure in WMC SMMD 2. Difficulties with calibration masses
5/149	First manned ATM Experiment Operations (attended checkout) EREP Checkout ¹ M071/M073, M092/M171 ² D008, S009, S228, T003	1. Six S190A malfunction lights on, No S191 ready light on 2. M092 leg band failure General: a. TV of SMMD and meal preparation b. Crew slept in MDA

TABLE 1. SL-2 EXPERIMENT/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
6/150	ATM (attended and unattended) ¹ EREP #1 ² M071/M073, M131, M110, M133 ³ T003, S019 ⁴ , S009, D008, ED76 VABD & CSM spectrometer readings	1. S055 High voltage tripout S082A frame counter not decrementing 2. Three S190A malfunction lights on, no S191 ready light 3. First sleep in OWS 4. S019 AMS failed General: TV of eating
7/151	ATM (attended and unattended) ¹ M071/M073, M092/M171, M133, M172 calibration S019, M487 ² Fire Drill	1. TV of ATM 2. Sound level meter would not calibrate
8/152	ATM (unattended) IMSS activation, M071/M073, M133 S009, T003, M487, D008 VABD Reading	General: a. Crew took first showers. b. False fire alarm - crew de-sensitized sensor c. TV of crew day off activities
9/153	ATM (attended and unattended) ¹ EREP #2 ² M071/M073, M092/M093, M131, M074 recalibration M151 ³ , S183, T003, S009, D008 VABD Reading, PRD Reading, Squeezer Bag Dump & Wardroom Window Observations	1. S054 thermal shield door failed closed. 2. S193 ready light not on in mode 1 3. Photos of S183 performance General: a. TV of EREP preparation b. TV camera SN 3005 failed c. OWS bus 1 & 2 C&W alarm d. Z-1 rate gyro failed

TABLE 1. SL-2 EXPERIMENT/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
10/154	ATM (attended and unattended) EREP #3 ¹ M071/M073, M092/M093 S183 ² , M487, T003, S009, D008 VABD & PRD Readings	1. S192 thermal and visible alignment not achieved 2. S183 film plate jammed General: TV out the wardroom window
11/155	ATM (attended and unattended) ¹ EREP #4 ² M071/M073, M092/M093, M133 S183, M487, T003, S009, D008 VABD & PRD Readings	1. HCO Calroc launched but destructed for range safety reasons. 2. S190A window cover left on 3. PRD readings appear incorrect
12/156	ATM (attended and unattended) EREP #5 ¹ , Earth Terrain Camera (ETC) ² M071/M073, M092/M093/M171, M131, M133 S019, T003, S009, D008 VABD & PRD Readings	1. S191 ready light not on 2. ETC operated for first time General: TV of EREP magazine load & M131
13/157	ATM (attended and unattended) ¹ EREP ² M071/M073, M092/M093/M171, M110 S019, T003, S009, D008 VABD & PRD Readings EVA Simulation	1. S055 high voltage tripout 2. Solar inertial pass, S193 data of typhoon Ava General: a. TV of M110 and EVA simulation.

TABLE 1. SL-2 EXPERIMENT/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
14/158	EVA Day ¹ ATM (attended and unattended) M071/M073 T003, S009, D008 VABD & PRD Readings	1. OWS SAS wing 1 successfully deployed, S054 door pinned open, and S082A film camera replaced. General: a. AM primary coolant loop anomaly b. TV of EVA
15/159	ATM (attended and unattended) ¹ M071/M073, M092/M093/M171 M487, M151, T003, S009, D008, ED31 VABD & PRD Readings	1. S055 high voltage tripout. General: AM tape recorder ¹ failed and replaced.
16/160	ATM (attended and unattended) EREP #6 ¹ , ETC M092/M093/M171, M071/M073, M131, M074 calibration, M133 M487, T003, S009, D008, M151, M516 VABD & PRD Readings, Microbiological DTO	1. S190A desiccants replaced General: a. Switchover from Primary to Secondary ATM DC. b. TV of M092
17/161	ATM (attended and unattended) ¹ EREP #7, ETC M071/M073, M092/M093/M171, M131 M487, T003, S009 ² , D008, M509 Activation VABD, PRD, & CSM Spectrometer Readings, Microbiological DTO, CO ₂ monitoring, Mole Sieve Vent observation Fire sensor malfunction procedure	1. S055 high voltage tripout, S052 camera failure 2. S009 door problem, experiment shutdown. General: a. TV of M171 b. Star Tracker drifted

TABLE 1. SL-2 EXPERIMENT/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
18/162	ATM (attended and unattended) EREP #8, ETC M071/M073, M092/M093/M171, M131, M133 M171 Calibration M151, M516, T003, S009 ¹ , D008, T027/S073 VABD, PRD, & CSM Spectrometer Readings, Squeezer Bag Dump observations Habitation area vent valve malfunction procedure	1. S009 reactivated General: a. CBRM 6 failed to respond to OFF command b. TV of M092
19/163	ATM (attended and unattended) EREP #9 ¹ M071/M073, M092/M093/M171, M172 calibration ² M151, M551, T003, S009, D008, T072/S073 VABD, PRD & CSM Spectrometer Readings	1. S190A intervalometer reset early 2. Completion of calibration from previous day General: a. TV camera used with VTS for Earth observation b. TV of M551 c. Cabin pressure drop d. AM 10W transmitter problem
20/164	ATM (attended and unattended) ¹ EREP #10 ² , ETC M071/M073, M092/M093/M171, M131, M133 M151, M553, T003, D008 VABD, PRD & CSM Spectrometer Readings	1. S055 door failed to open at sunrise. NRL Calroc launched successfully. 2. TV camera used with VTS for Earth observation General: a. TV of M131 b. Star tracker failed to acquire
21/165	ATM (attended and unattended) EREP #11, ETC, Lunar Calibration M071/M073, M092/M093/M171 M151, M553, M487, T003, D008, T027/S073/ED31 VABD, PRD & CSM Spectrometer Readings	General: a. CSM fuel cells shut down. b. RF power section of AM Transmitter A10 failed

TABLE 1. SL-2 EXPERIMENT/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
22/166	ATM (attended and unattended) ¹ M071/M073, M092/M171, M131, M133 M552, M553, T003, D008, T027/S073, ED31 VABD, PRD & CSM Spectrometer Readings Entry - 7 day checks	1. S055 high voltage tripout General: TV crew tour 1 and ED 31
23/167	ATM (attended and unattended) Re-entry Simulations M071/M073, M092/M093/M171, M131 M151, ED31, M487, M516, M552, M553, T003, D008, T027/S073 VABD, PRD & CSM Spectrometer Readings	General: a. A water dispenser valve in the WMC failed and was replaced b. A leak in the AM condensate system was experienced c. TV of crew tour 2
24/168	ATM (attended and unattended) ¹ CSM Trim Burn M071/M073, M092/M093/M171, M074 calibration M131 ED31, S019, T003, T027/S073, M509 ² , T027, ED23, ED26, S228	1. S056 door failed to reach full open 2. Equipment checkout and propellant supply system bottle 3 recharge General: TV of sleep and foot restraints
25/169	ATM (attended and unattended) ¹ M071/M073, M092/M093/M171, M172 calibration M133 M151, T003, M509 ² , D008 VABD, PRD, CSM Spectrometer Readings ECS condensate troubleshooting	1. S056 door failed open 2. Equipment checkout. General: Star tracker failed to acquire

TABLE 1. SL-2 EXPERIMENT/SYSTEMS OPERATIONS (Concluded)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
26/170	ATM (unattended) EVA ¹ M071/M073, M133 M151, T003, S183, M487, M516, D024, ED76 S009, D008, T027 ² PRD & CSM Spectrometer Readings, Microbiological DTO	1. CBRM 15 reactivated with hammer blows, ATM film replaced, and D024 panels retrieved. 2. Problem with valve actuator General: a. Star tracker locked on contaminant particle. b. Parasol rotated c. TV of EVA
27/171	ATM (unattended) ¹ M071/M073, M092/M093/M171, M110, M133 M151, T003, S183, M487, M516, S149, D008 VABD, PRD & CSM Spectrometer Readings & STS Window Photos TV Press Conference OWS Deactivation Initiated	1. X-ray radio frequency history plotter failed
28/172	OWS Deactivation Re-entry Review ATM (unattended) MDA/AM Deactivation	General: Y-2 rate gyro failure Trash airlock malfunction
29/173	OWS/MDA Close Out Undocking Separation Fly Around Re-entry Splashdown	General: Refrigeration system anomaly

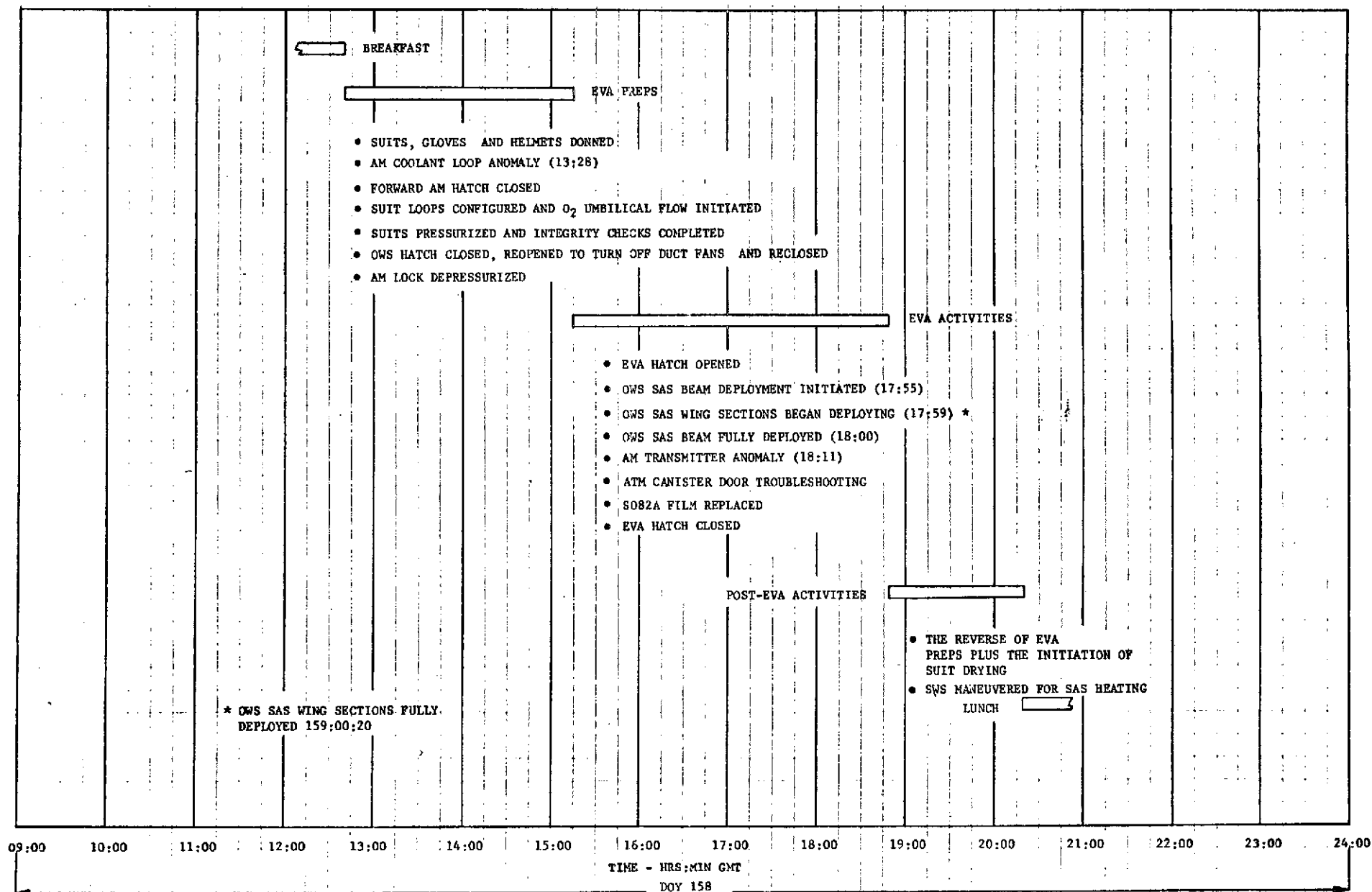


FIGURE 9. EVA NO. 1 - ACTUAL (NONE PLANNED)

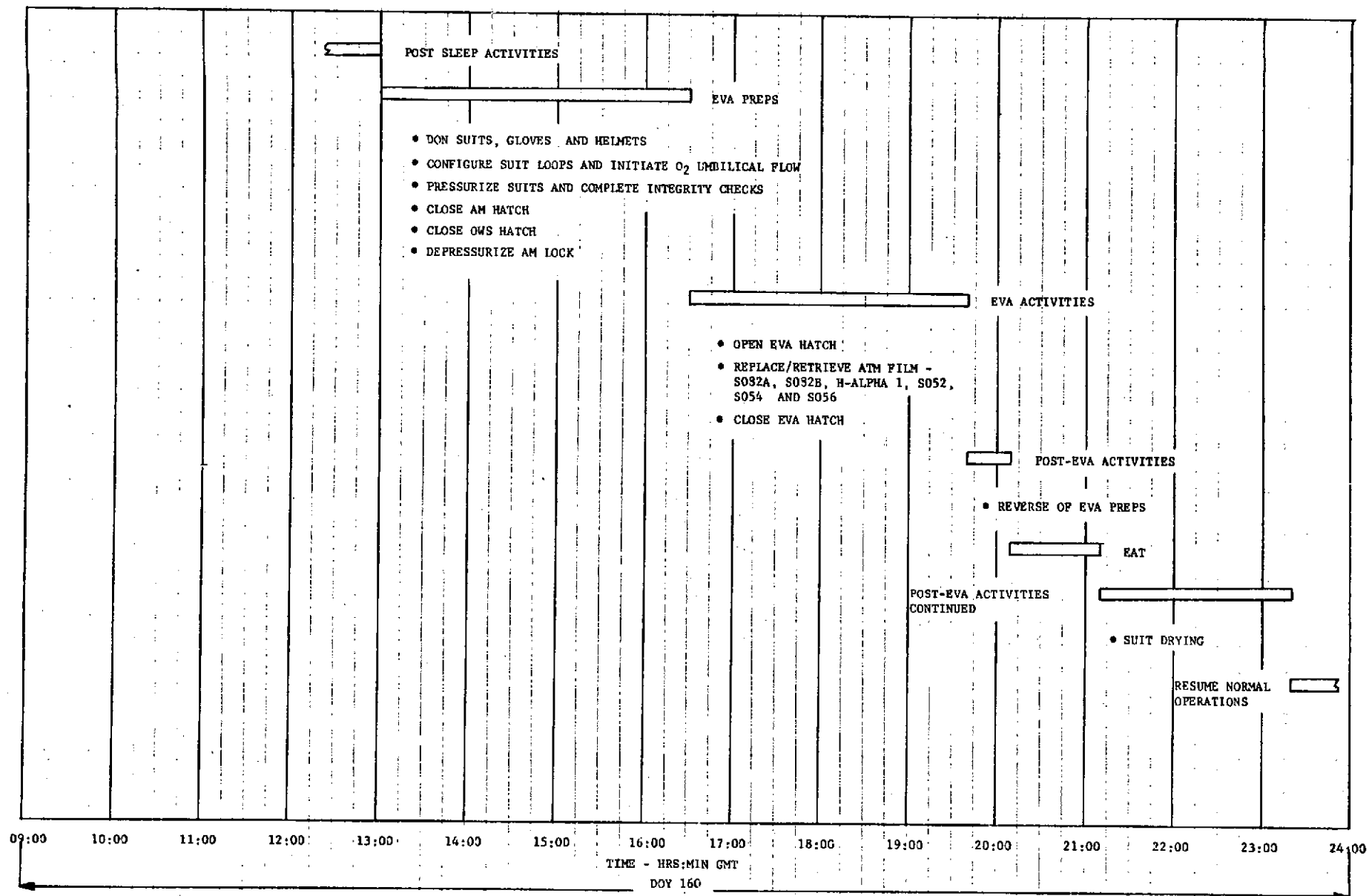


FIGURE 10. EVA NO. 2 - PLANNED

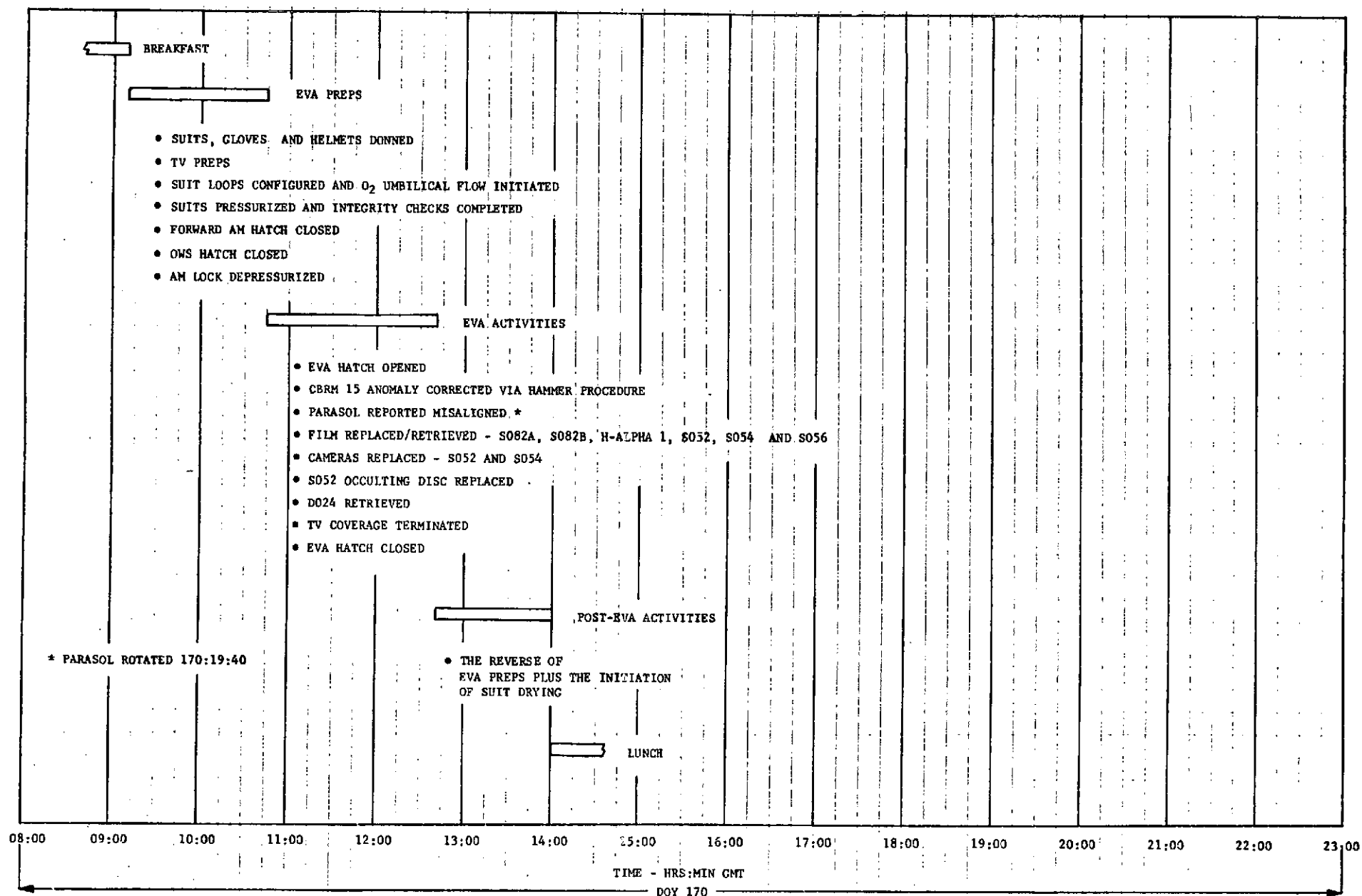


FIGURE 11. EVA NO. 2 - ACTUAL

SL-1/SL-2 DEACTIVATION

The planned and actual deactivation sequences, shown in Figures 12 and 13 , respectively, were similar. The refrigeration system anomaly on DOY 173 caused the crew to re-enter the OWS for some final checks but did not significantly delay undocking.

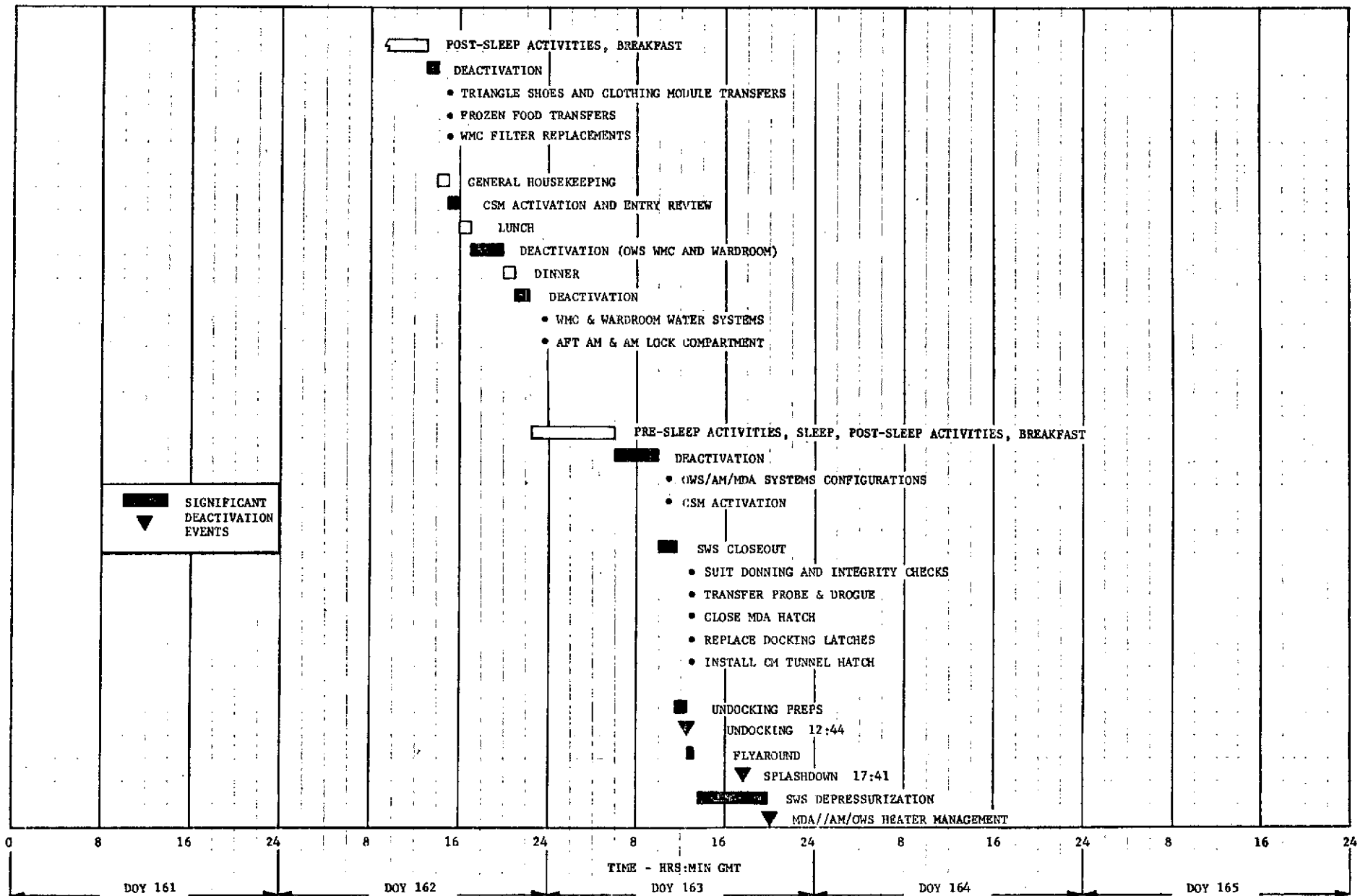


FIGURE 12. SL-2 DEACTIVATION - PLANNED

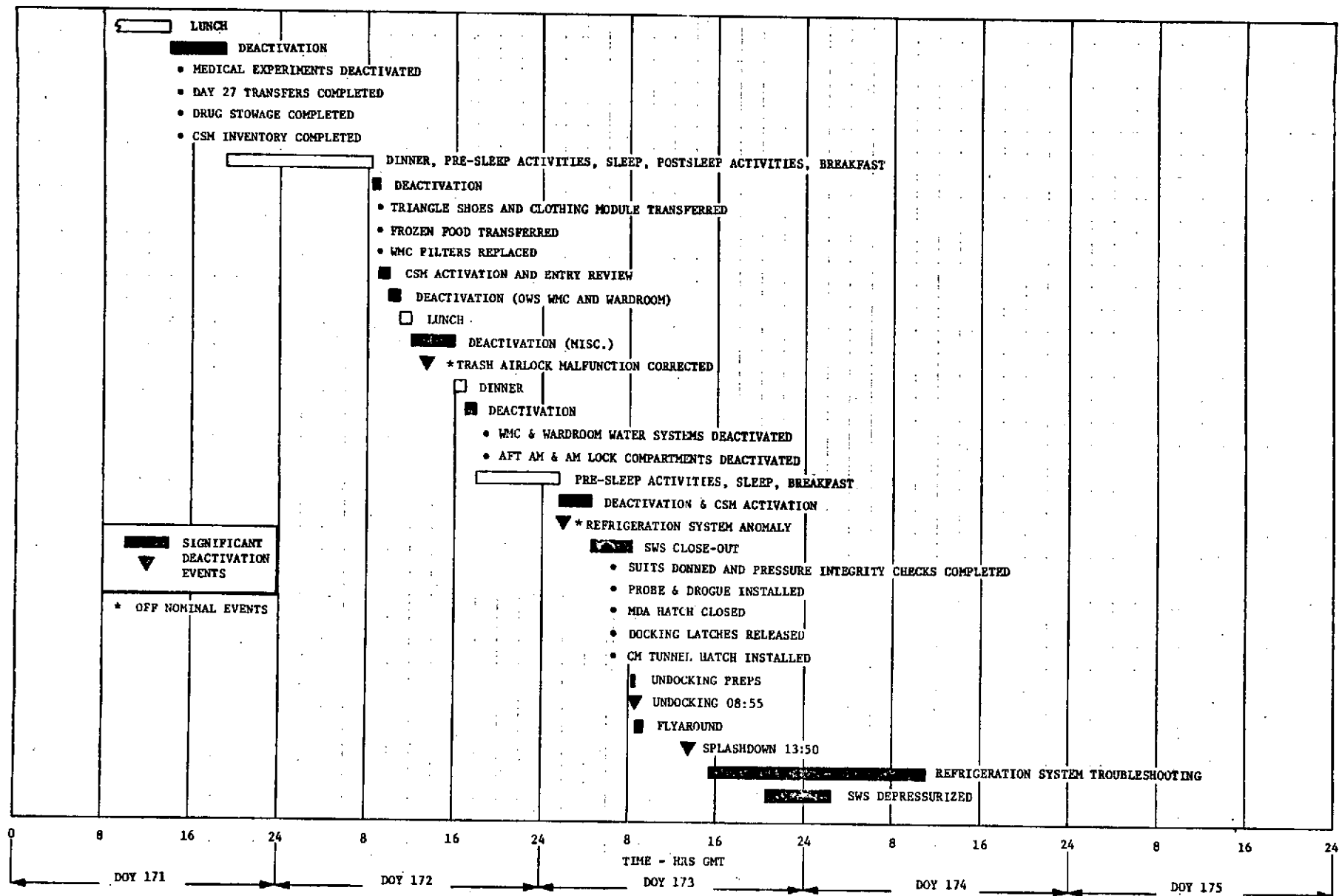


FIGURE 13. SL-2 DEACTIVATION - ACTUAL

SL-3

The Skylab 3 mission was launched on July 28, 1973 at 11:10:50 GMT and terminated on September 25, 1973, at 22:19:54 GMT. The mission lasted 59 days, 11 hours, 9 minutes and 4 seconds. The mission was threatened with an early termination when 2 of the 4 CSM RCS quads had to be isolated from the system when they were detected to be leaking oxidizer. When a decision to proceed with the mission was made, the rescue CSM was configured in case the SL-3 CSM was incapable of returning.

Major problems occurring during the course of SL-3 were as follows:

1. Intermittent leaks in the AM condensate system and trouble dumping the holding tank until the WMC water dump heater probe changeout were experienced.
2. Suspected coolanol leakage in the AM coolant loops resulted in shutdown of the primary loop. Leakage rate of the secondary coolant loop was determined to be low enough to continue SL-3 mission usage.
3. Rate gyro problems continued until installation of the rate gyro six-pack.
4. Leaks in CSM RCS quads B and D were detected resulting in these quads being isolated from the system.

Figures 14 and 15 present the planned and actual SL-3 mission events, respectively. Planned refers to pre SL-3 mission planning as described in the SL-3 Final Skylab Flight Plan, July 14, 1973. The main differences between the planned and actual sequences were as follows:

1. SL-3 Unmanned Phase shortened from 57 to 36 days.
2. Extension of the mission from 56 to 59 days.
3. The absence of trim burns (3 planned).
4. Installation of the rate gyro six-pack.

The major mission phases are discussed in subsequent sections.

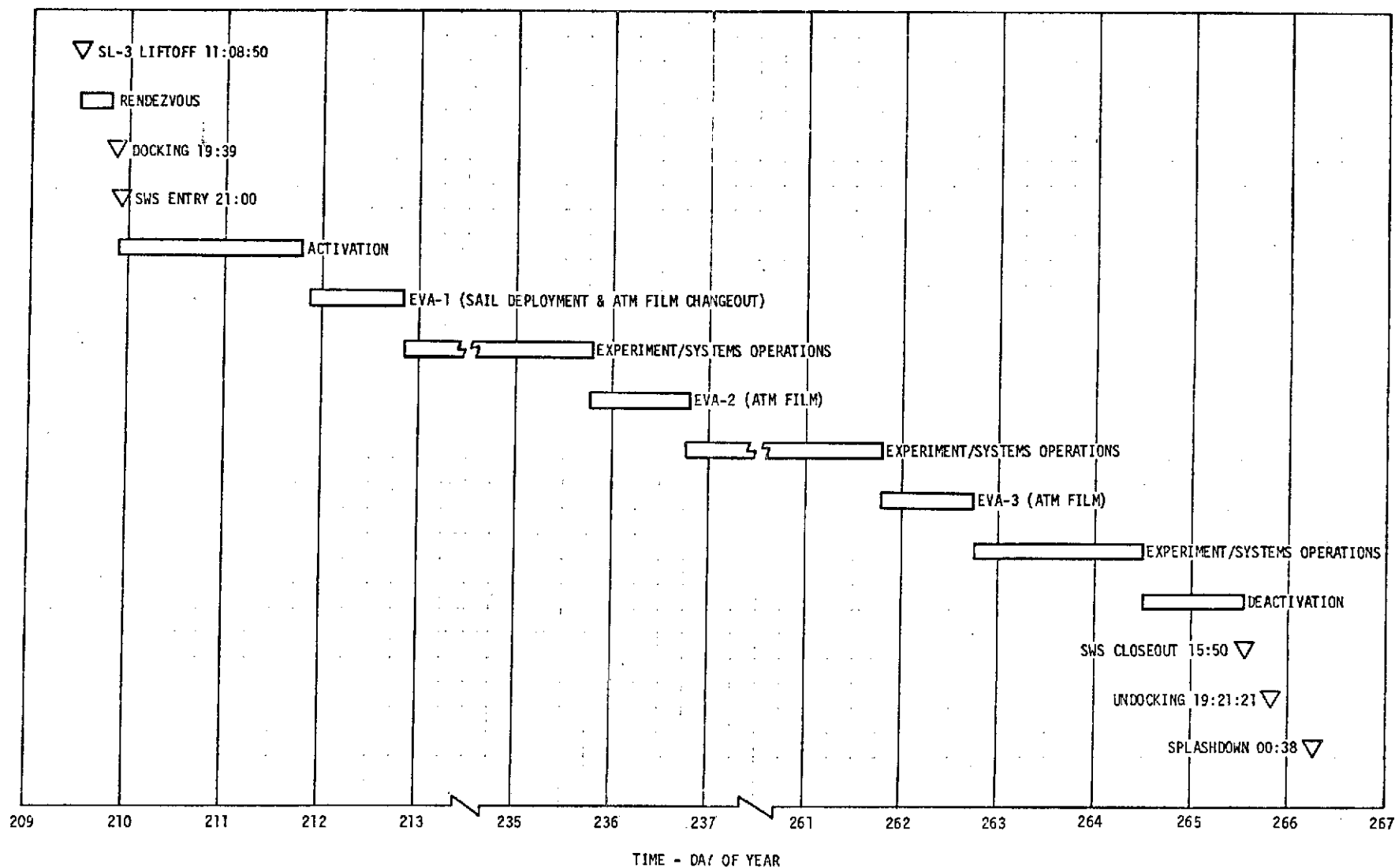


FIGURE 14. SL-3 SUMMARY - PLANNED

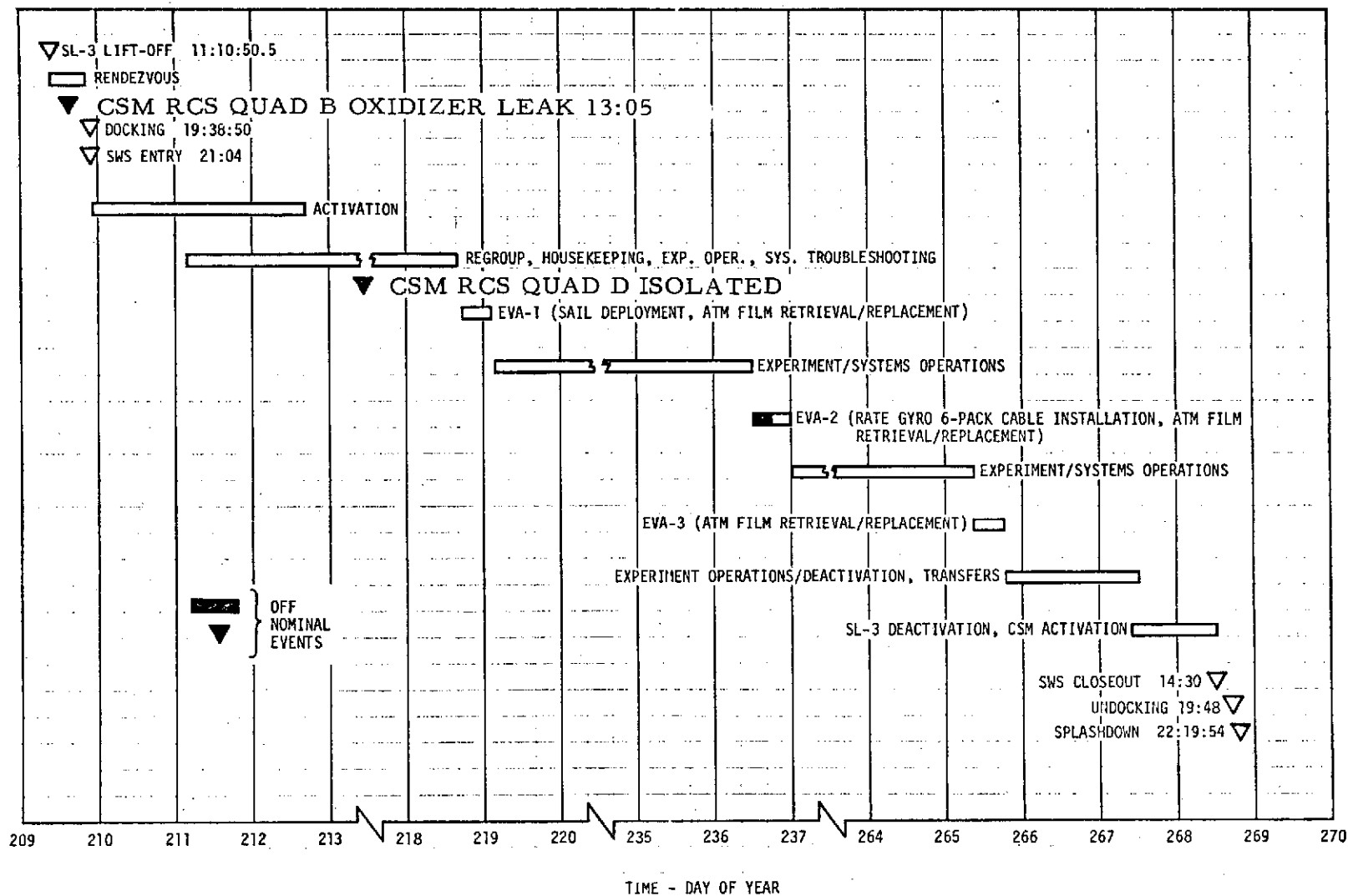


FIGURE 15. SL-3 SUMMARY - ACTUAL

SL-3 UNMANNED MISSION PHASE

Figure 16 presents the SL-3 Unmanned Mission Phase events. This phase was reduced from 57 days to 36 days as a result of the early launch of the SL-3 crew.

Depressurization of the SWS began about 12 hours after SL-2 undocking and continued for approximately 6 hours. The initial depressurization was terminated at approximately 2 psia. The SWS pressure decayed due to leakage throughout most of the unmanned phase. About 40 hours prior to launch of the SL-3 crew, the OWS solenoid vent valves were commanded open via DCS commands resulting in further depressurization of the SWS. The final depressurization was terminated at about 0.65 psia and repressurization began immediately, about 31 hours prior to launch. Repressurization was terminated at 5 psia, approximately 20 hours prior to launch.

Troubleshooting of the OWS Refrigeration System anomaly, which occurred during SL-2 deactivation, began approximately 4 hours after SL-2 splashdown. The primary and secondary refrigeration systems were cycled ON/OFF approximately 100 times and 40 times, respectively, via DCS commands.

ATM operations were carried out as planned until day of year (DOY) 197 when the Experiment Pointing Control (EPC) primary up/down (pitch) rate gyro failed. Operations of the White Light Coronagraph (S052) and the Ultraviolet Scanning Polychromator/Spectroheliometer (S055A) were terminated following the EPC rate gyro anomaly. X-Ray Spectrographic Telescope (S054) data continued to be collected. On DOY 200 the EPC was tested using the secondary pitch rate gyro and operated satisfactorily.

Limited S052 and S055A operations were resumed on DOY 200 and limited operations continued until DOY 210, when the EPC system was powered up and normal ATM operation was resumed.

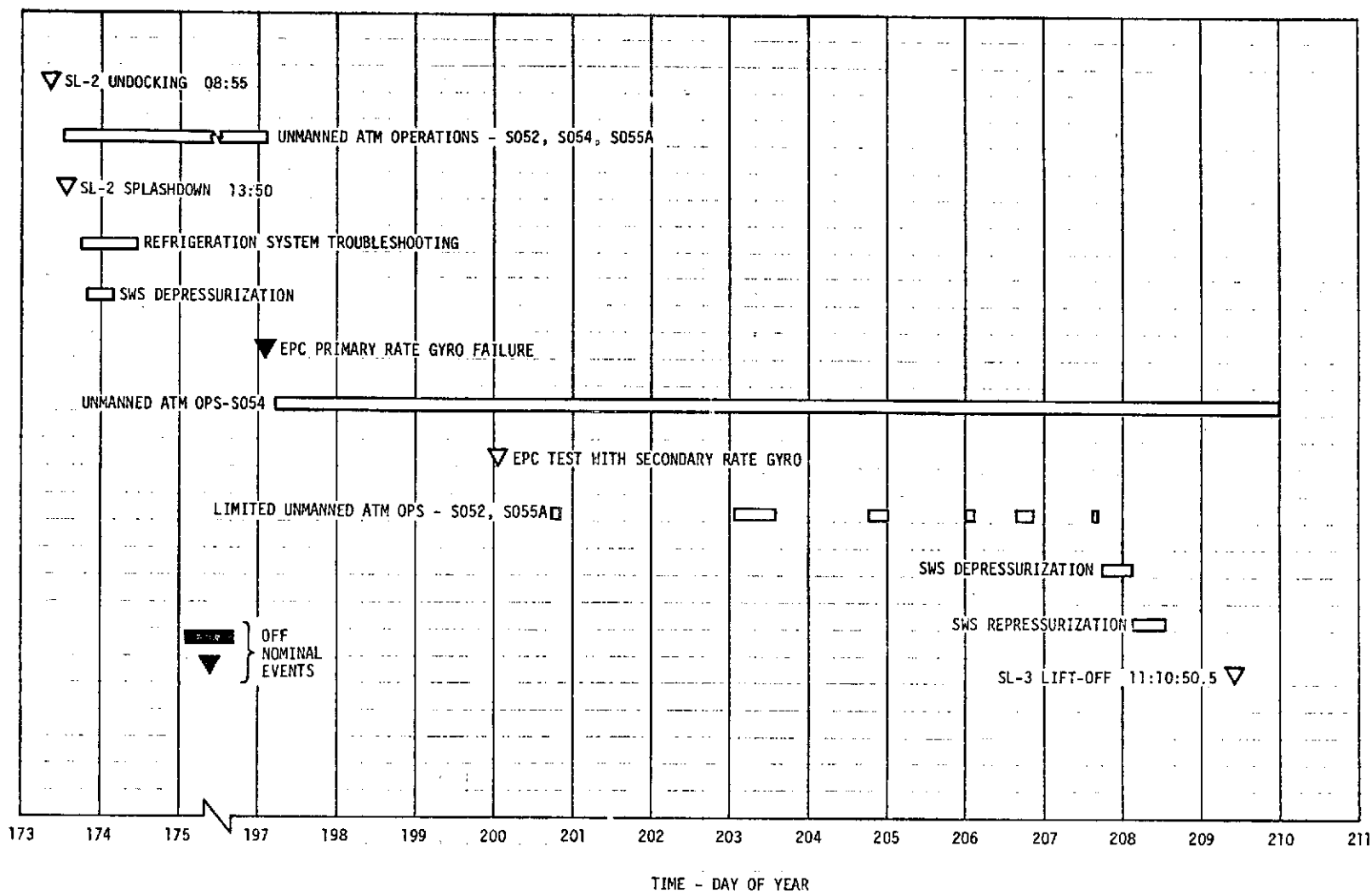


FIGURE 16. SL-3 UNMANNED PHASE OPERATIONS

SL-3 ACTIVATION

The planned and actual SL-3 activation sequences are shown in Figures 17 and 18, respectively. Because of the condition of the SWS, the SL-3 launch was moved up 11 days to permit installation of the twin pole sail as soon as possible.

During rendezvous it was found that CSM RCS quad-B was leaking oxidizer. Subsequently, quad-B was isolated from the system. Later, quad-D was found to be leaking oxidizer and was isolated from the system. This CSM condition was watched very closely and a decision was made to continue the mission. However, work to ready the rescue CSM began in case the SL-3 CSM condition deteriorated.

During the first day of activation, the crew reported they were suffering from motion sickness. The result of the motion sickness was a delay in completing the activation of the SWS and a 6-day delay of the first EVA.

Activation generally went as planned except for the slowdown due to the crew's motion sickness. Concern arose over an intermittent leak in the ECS condensate system. Extensive troubleshooting procedures were performed to determine the cause and source of the leak. Eventually, the system was configured to permit satisfactory operation.

Other troubleshooting procedures performed during activation were:

- 1) Mole sieve troubleshooting when mole sieve B secondary fan circuit breaker popped open on initial use.
- 2) Water system troubleshooting when a gauge of the water dump line did not show the proper pressure differential.
- 3) Quad B troubleshooting and isolation procedures.

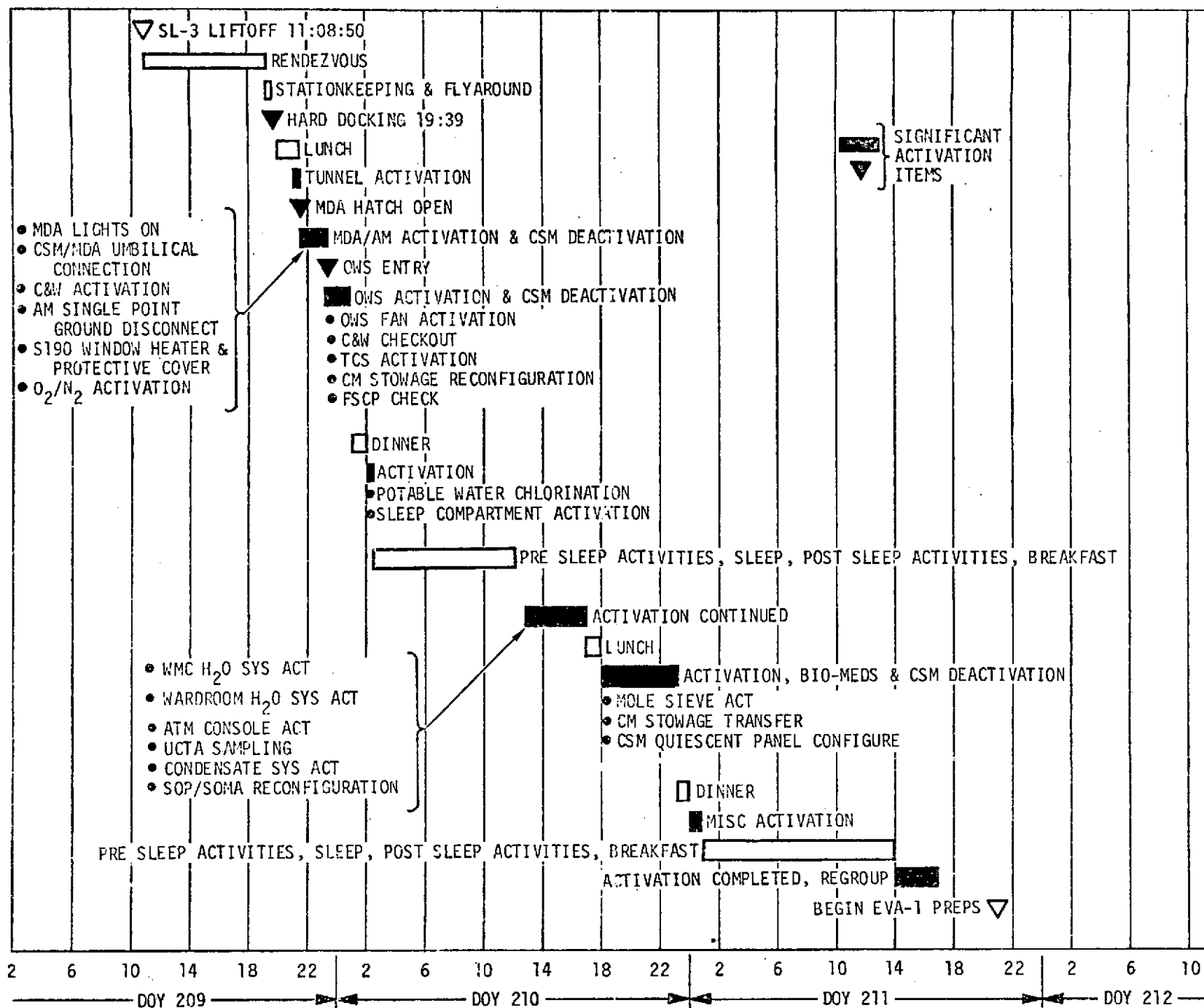


FIGURE 17. SL-3 ACTIVATION - PLANNED

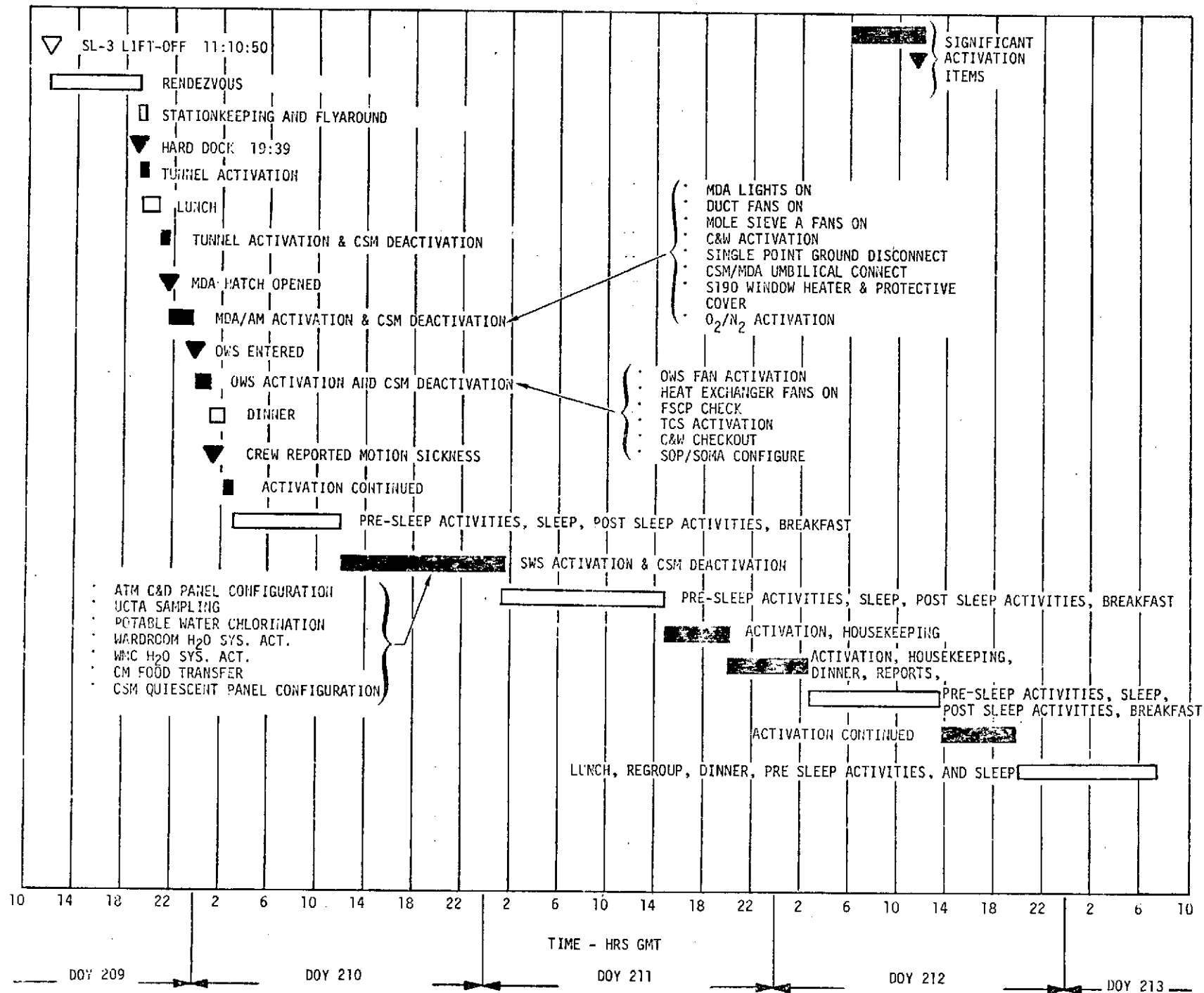


FIGURE 18. SL-3 ACTIVATION - ACTUAL

SL-3 EXPERIMENT/SYSTEMS OPERATIONS

The planned mission called for 44 experiments, 14 science demonstrations, 11 student investigations, and 8 subsystem/operational detailed test objectives. The completion of experiment on this mission was excellent. The science demonstrations were to be completed at crew option and 6 of the planned 14 were accomplished. All but 4 of the planned student investigations were completed. Data were obtained on all but 2 of the planned detailed test objectives.

Generally the SL-3 planned experiment objectives were met or exceeded except for cases where there was hardware failure. The solar scientific airlock was still occupied by the parasol, prohibiting its use for corollary experiments. Since the trim burns were not executed due to the condition of the CSM, the Earth Resources Experiment Package (EREP) ground tracks drifted 3°9' to the east of the nominal ground tracks. The Contamination Measurement and Gegenschein/Zodiacal Light (T027/S073) hardware had to be jettisoned from the anti-solar scientific airlock when the trunnion shaft stuck.

Table 2 shows the experiment operations and crew activities on a daily basis. Remarks are also included to explain an activity or note an anomaly.

The crew performed three extravehicular activities. All EVA's were longer than planned and the first EVA was delayed 6 days because of the crew's slow acclimation to zero gravity. The rate gyro six-pack cable was installed on the second EVA. The loss of the AM primary coolant loop due to depletion of coolant resulted in the use of gas cooling of the EVA suits for the third EVA.

Figures 19, 20, 21, and 22 present EVA #1 planned, EVA #1 actual, EVA #2 actual, and EVA #3 actual, respectively. EVA #2 planned and EVA #3 planned are similar to EVA #1 planned except for the twin pole sail deployment and, therefore, are not shown.

During the experiment operations phase, repeated problems occurred concerning: 1) ATM thermal shield doors, 2) the Star Tracker shutter, and 3) the OWS Low Level Multiplexer B. APCS rate gyro problems were reduced with the operation of the rate gyro six-pack.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
1/209	ATM (Unattended) M071/M073, S149, S150 ¹ VABD, PRD & CSM spectrometer readings SWS activation ⁴ Launch, rendezvous ³ , stationkeeping ²	1) S150 Exp. Terminated early 2) Crew noted parasol fluttered when RCS fired. TV camera malfunction during flyaround. 3) SM RCS Quad "B" failed 4) Mole sieve fan breaker opened when fan turned ON.
2/210	ATM (Unattended) M071/M073 VABD, PRD readings SWS activation	General: a. Crew activities curtailed due to motion sickness. b. S071/S072 experiment failed
3/211	ATM (Unattended) M071/M073, M110, M074, M172 calibration VABD, PRD & CSM spectrometer readings SWS activation	General: a. Crew activities curtailed due to motion sickness. b. AM condensate system commenced leaking c. TV of M172 calibration.
4/212	ATM (Unattended) M071/M073, M074 calibration S149 ¹ , ED63 ² , ED52 ³ VABD, PRD & CSM spectrometer readings SWS activation	1) S149 retracted & stowed. 2) ED63 deployed. 3) ED52 camera actuator failed to operate 4) O ₂ sensor failed and replaced General: a. Crew activities curtailed due to motion sickness. b. TV of swimming fish.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
5/213	ATM (Unattended) M071/M073, M092, M171, M131 S149 ¹ , T027/S073 VABD, PRD & CSM spectrometer readings S192 ²	1) S149 prepared for deployment on EVA 1. 2) S192 malfunction procedures conducted. General: TV of crew eating meal.
6/214	ATM (Unattended) EREP (C/O pass) M071/M073, M092, M171, M110, M151 T027/S073 ¹ , M509 ²	1) Part of F024 & three malfunction procedures run. 2) Charging of batteries started. General: a. TV of crew in medical area. b. SM RCS Quad D failed
7/215	ATM (Unattended) EREP pass No. 1 M071, M073 T027/S073 ¹ , T003 VABD, PRD & CSM spectrometer readings	1) Attempt to retract T027/S073 failed General: TV of EREP pass preparation.
8/216	ATM (Unattended) EREP ² pass No. 2 M071/M073, M092, M093, M171, M131, M133 T027/S073 ¹ T003, S019 VABD & CSM Spectrometer readings	1) T027/S073 jettisoned. 2) S190B (Earth Terrain Camera) power interruption General: a. TV of T027/S073 jettison. b. ATM short circuit

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
9/217	ATM (Unattended) EREP passes No. 3 ¹ & 4 ¹ M071/M073, M133, M151 T003 VABD & CSM spectrometer readings	1) Earth Terrain Camera used. General: a. TV of Science Pilot operating ETC. b. AM coolant leak indicated
10/218	ATM (Unattended) M071/M073, M133, M151 S149, S230, T003 VABD, PRD & CSM spectrometer readings EVA 1 ¹	1) EVA 1 activities. a. S149 deployed. b. S230 outer collector assemblies retrieved & shields installed on fwd inner collector. c. S055 ramp latch removed. S056 film replaced. H-Alpha 1 film replaced S082A & B cameras & film replaced. d. Sunshield installed, (twin-pole sail).
11/219	ATM (Attended & Unattended) M071/M073, M092, M093, M171, M131, M151 T003, M487, S063 activation, M516 VABD & CSM spectrometer readings	General: TV of ATM C&D console operation & metabolic activity.
12/220	ATM (Attended & Unattended) EREP ¹ pass No. 5 M071/M073, M092, M093, M131 T003, M487 VABD & CSM spectrometer readings	1) S190A film depleted prior to completing pass. S191 VTS drifting off target Earth Terrain Camera used. General: TV of M131

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
13/221	ATM (Attended and Unattended) ¹ EREP ² pass No. 6 M071/M073, M133, M131 T003, M487, S063 VABD & CSM spectrometer readings ED 52	1) HCO Calroc launched. 2) S191 door operation slow & jerky General: a. TV of arm exercises. b. Crew experiencing nasal congestion.
14/222	ATM (Attended and Unattended) M071/M073, M110 T003, S019 VABD & CSM spectrometer readings	General: a. TV of ED52 (Web Formation). b. TV of Pilot performing maneuvers inside OWS.
15/223	ATM (Attended and Unattended) EREP passes No. 7 ¹ & 8 ¹ M071/M073, M151 T003, M487, T002 VABD, PRD & CSM spectrometer readings, iodine monitoring ED32, ED63	1) S191 door operation erratic Earth Terrain Camera used. General: TV of ED32.
16/224	ATM (Attended and Unattended) EREP ¹ pass No. 9 & Lunar calibration M071/M073, M151, M092, M093, M133 T003, M487, T002, S019 VABD, PRD & CSM spectrometer readings ED32	1) Earth Terrain Camera used. General: Major APCS problem occurred which used impulse of 2584 1b-sec

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
17/225	ATM (Attended and Unattended) M071/M073, M092, M093, M151, M171 T003, M509, T002 VABD, PRD & CSM spectrometer readings ED32	General: TV of M509.
18/226	ATM (Attended and Unattended) M071/M073, M131, M133 T003, T013 C/O, S063, T002 ¹ VABD, PRD & CSM spectrometer readings, Iodine monitoring ED63 ² Science Demonstration 10 (Fish Otolith) ³	1) Data voided due to Pilot problem with stadiometer. 2) Experiment terminated due to dead plants. 3) Fingerling hatched. General: TV of M074 & ED63
19/227	ATM (Attended and Unattended) M071/M073, M092, M093, M171, M133, M151 S019, T003, M509, T002 VABD, PRD & CSM spectrometer readings	General: TV of crew eating.
20/228	ATM (Attended and Unattended) M071/M073, M092, M093, M171, M110 S019, T003, M509, T013 ¹ , T002 VABD, PRD & CSM spectrometer readings	1) Two FMU load cells failed General: a. CSM fuel cells shut down. b. Power transferred from CSM to SWS. c. TV of T013.
21/229	ATM (Attended and Unattended) EREP hand held photos ¹ M071/M073, M092, M093, M151 T003, M509, S019 VABD, PRD & CSM spectrometer readings ED26	1) Hand held photos of Langila Volcano, New Guinea. General: TV of M509.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
22/230	ATM (Attended and Unattended) EREP hand held photos ¹ M071/M073, M133 M487, T003 VABD, PRD & CSM spectrometer readings	1) Hand held photos of tropical storm "Brenda", Tonga submarine volcano, & Maria-Theresa Reef. General: a. Crew day off. b. TV of tropical storm "Brenda." c. TV of crew day off activities. d. CM water glycol leak
23/231	ATM (Attended and Unattended) M071/M073, M092, M093 T003, M487, T020 VABD, PRD & CSM spectrometer readings	General: a. TV of tropical storm "Brenda." b. TV of T020. c. Mark I exerciser rope broke, exerciser remains operational.
24/232	ATM (Attended and Unattended) M071/M073, M092, M093 S019 ¹ , T003, M487 VABD, PRD & CSM spectrometer readings ED23	1) Articulated Mirror System failed to retract General: a. TV test of both cameras. b. TV of M092. c. MDA aft lights failed
25/233	ATM (Attended and Unattended) M071/M073, M092, M093, M171, M133, M172 S019 ¹ , M487, T002, T003, M509 VABD, PRD & CSM spectrometer readings	1) Articulated Mirror System retracted successfully. General: a. TV of Science Pilot at ATM C&D console.
26/234	ATM (Attended and Unattended) M071/M073, M092, M093, M171, M131, M151 S019, M487, T003, T002 VABD, PRD & CSM spectrometer readings	General: TV of meal preparation.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
27/235	ATM (Attended and Unattended) M071/M073, M092, M093, M171, M074 calibration, M133 S019, T003, S063 VABD, PRD & CSM spectrometer readings	General: a) AM primary coolant system shutdown.
28/236	ATM (Attended and Unattended) M071/M073, M074 calibration, M151 M516, T003, S063 VABD, PRD & CSM spectrometer readings EVA 2 ¹	1) EVA 2 activities a) Rate gyro 6-pack cable installation. b) JSC sail sample deployment. c) S149 temporary storage & re-deployment. d) S056/S082A thermal shield door ramp latch removal. e) ATM film replaced: S052, S054, S056, S082A, S082B & H-Alpha 1. General: a. Leak developed in CDR's liquid cooled garment. b. TV of EVA 2 activity, TV camera failed
29/237	ATM (Attended and Unattended) M071/M073, M092, M093, M131 ¹ S019, T003, M516, T002 VABD, PRD & CSM spectrometer readings	1) Oculogyral illusion part of M131 not run since Pilot had sty in the eye. General: a. Time Reference System exhibited erratic behavior TV of Mark II exerciser.
30/238	ATM (Attended and Unattended) M071/M073, M133, M110 T003, M487 VABD, PRD & CSM spectrometer readings ED52 ¹ Science Demonstrations ²	1) Prime spider "Arabella" returned to vial, backup spider "Anita" deployed. 2) "Energy loss & angular momentum" & "water drop". General: a. Crew day off. b. TV of spider transfer & science demonstration.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
31/239	ATM (Attended and Unattended) M071/M073, M092, M093, M172 calibration, M151 T003, M509, S063 VABD, PRD & CSM spectrometer readings ED74	General: a. TV of "Science Pilot Highlights": b. TV of M509.
32/240	ATM (Attended and Unattended) M071/M073, M092, M093, M171, M131 S019, S183, T003 VABD, PRD & CSM spectrometer readings ED52	General: a. TV of crew quarters. b. TV of spider web formation. c. Screw lost from bicycle ergometer pedal.
33/241	ATM (Attended and Unattended) EREP ¹ M071/M073, M092, M093, M171, M151 S019, T003, T020, T002 VABD, PRD & CSM spectrometer readings	1) Earth Terrain Camera only - Solar Inertial General: a. TV of tropical depression. b. TV of T020. c. TV of crew quarters.
34/242	ATM (Attended and Unattended) EREP ¹ M071/M073, M092, M093, M171, M151, M133, M171 Special Test ² S019, S183 ³ , T003, T002, T013 VABD, PRD ⁴ & CSM spectrometer readings	1) Earth Terrain Camera - Special attitude for photo- graphing hurricane "Christine". Hand held photos of a) deserts of southwest Africa, b) Straits of Magellan, c) Locust swarm in Africa, d) Patagonian desert of Argentina, e) Mali drought area of Africa. 2) Run to verify accuracy of Mode 1 operation of meta- bolic analyzer. 3) Photos using DAC camera only. 4) Science Pilot & Pilot only. General: a. H ₂ O tank 10 depleted, switch over to H ₂ O tank 2 accom- plished. b. TV of spider web formation c. TV of crew's Achilles tendon reflex. d. TV of S183 installation in SAL.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
35/243	ATM (Attended and Unattended) EREP Hand Held Photos ¹ M071/M073, M092, M093, M074/M172 T003, M509, S063 VABD, PRD & CSM spectrometer readings	1) Hand held photos of a) Western Bolivia, b) Brazil Forest, c) Central America, d) Tropical storm "Christine". General: a. TV of M093 b. TV of tropical storm "Christine".
36/244	ATM (Attended and Unattended) EREP pass no. 10 M071/M073, M092, M093, M151, M172 S019, M487, T003 VABD, PRD & CSM spectrometer readings ED78 ¹	1) Experiment hardware failed. General: a. TV of ED78. b. TV tour of MDA, AM & Fwd area of OWS.
37/245	ATM (Attended and Unattended) EREP ¹ passes No's. 11 & 12 & 1 solar inertial pass M071/M073, M133 T003, T025, S020 ² VABD, PRD & CSM spectrometer readings	1) Includes Earth Terrain Camera. Hand held photos of a) Spain, b) Mexico earthquake, c) Tropical storm "Delia" & d) Chihuahua, Mexico. 2) EVA bracket fit checks. a) Crew day off. b) AM condensate leak apparently stopped.
38/246	ATM (Attended and Unattended) EREP pass No. 13 M071/M073, M110, M092, M093, M171, M151, M172 S183 ¹ , T027/S073 ² , S063 ³ , T003 VABD & CSM spectrometer readings	1) Accomplished utilizing S019 hardware. 2) Gegenschein photos taken using T025 hardware. 3) Visible light photos not obtained due to camera problem. General: a. TV of S063. b. TV of tropical storm "Delia".

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
39/247	ATM ¹ (Attended and Unattended) EREP passes No's. 14 & 15 M071/M073, M092, M093, M171, M172 S183 ² , T013, T002, T003 VABD & CSM spectrometer readings	1) HCO Calroc launched successfully. 2) Accomplished utilizing S019 hardware. General: a. Crew awakened by loud thump, attributed to thermal expansion/contraction of SWS. b. TV of North Africa, Gibraltar, Mediterranean Sea & Italy using Viewfinder/Tracking System (VTS) telescope. c. TV of tropical storm "Delia".
40/248	ATM (Attended and Unattended) EREP ¹ M071/M073, M092, M093, M171, M172, M133 ³ S183, M487, T002, T003 VABD, PRD & CSM spectrometer readings Science Demonstration ²	1) EREP pass cancelled due to solar activity requiring use of ATM. 2) Surface tension effects of water droplet in zero gravity. 3) Data lost after 1/2 hour due to inadequate application of electrolyte on sensors. General: TV of science demonstration, free-floating water droplets.
41/249	ATM (Attended and Unattended) EREP pass No. 16 M071/M073, M092, M093, M131, M151 S183 ¹ , M516, T003, S063 VABD, PRD & CSM spectrometer readings	1) Accomplished utilizing S1019 hardware. General: TV of pilot doing arm exercises on ergometer.
42/250	ATM ¹ (Attended and Unattended) EREP pass No. 17 M071/M073, M092, M093, M172, M151 M487, T002, T003, S063 VABD, PRD & CSM spectrometer readings	1) Largest solar flare of Skylab mission observed. General: TV of EREP preparation.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
43/251	ATM (Attended and Unattended) M071/M073, M092, M093, M131, M133, M172 M487, T003, S063 VABD, PRD & CSM spectrometer readings	General: a. TV of M172. b. TV of 1st part of SL-4 briefing. c. H-Alpha 2 door failed to close fully
44/252	ATM (Attended and Unattended) EREP ¹ pass No. 18 M071/M073, T003, M557 VABD, PRD & CSM spectrometer readings Science Demonstration (SD12)	1) EREP EDDU intermittent Earth Terrain Camera used. Hand held photo of Gulf of Panama. General: a. TV of Science Demonstration, electrostatic and magnetic effects. b. TV of 2nd part of SL-4 briefing. c. Crew day off.
45/253	ATM (Attended and Unattended) EREP ¹ passes No's. 19 & 20 M071/M073, M092, M093, M171 T003, M562 VABD, PRD & CSM spectrometer readings Environmental Microbiology ²	1) Earth Terrain Camera used. 2) Samples from SWS hardware crew. General: a. TV of drought area of Africa. b. TV of 3rd part of SL-4 briefing.
46/254	ATM (Attended and Unattended) EREP ¹ pass No's. 21 & 23 & Lunar calibration M071/M073, M092, M093, M171, M133 T003, M562, M566, S019, T002, M487	1) Earth Terrain Camera used. EREP pass No. 22 cancelled due to weather. Lunar calibration pass conducted in solar inertial. General: a. TV of southern Europe thru S191 (VTS). b. S082A thermal shield door failed to close

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
47/255	ATM (Attended and Unattended) EREP ¹ passes No's. 24, 25 & 26 M071/M073, M092, M093 ² , M151 T003, S183, T002, M566 VABD, PRD & CSM spectrometer readings	1) Earth Terrain Camera used. Hand held photos of a) North African drought, b) Germany, c) Guadalajara, d) West Malaysia & Northern Australia. 2) AM tape recorder malfunctioned, no data obtained. General: TV of ATM C&D operations.
48/256	ATM (Attended and Unattended) EREP ¹ passes No's 27 & 28 plus one solar inertial pass M071/M073, M092, M093, M110, T003, T020, M564 VABD, PRD & CSM spectrometer readings	1) Earth Terrain Camera used. Hand held photos of a) Great Plains area of United States and b) Germany. General: a. TV of T020 b. Crew reported no video on TV monitor c. AM tape recorder failed
49/257	ATM (Attended and Unattended) EREP ¹ pass No. 29 ² M071/M073, M092, M093, M133, M172 S019, T003, S063, T002, M559 VABD, PRD & CSM spectrometer readings Science Demonstration	1) S193 antenna failed to scan properly. Hand held photos of a) Spain, b) Germany, c) Gulf of Panama & d) Eastern Malaysia. 2) EREP pass No. 30 cancelled. General: TV of Science Demonstration, Wilber- Force pendulum and paper airplane.
50/258	ATM (Attended and Unattended) EREP ¹ passes No's. 31 & 32 M071/M073, M092, M093, M171, M151 T003 VABD, PRD & CSM spectrometer readings Orbital Assembly contamination assessment ²	1) Earth Terrain Camera used. Hand held photos of areas in Italy and Germany. 2) Observations, photographs and comments on the characteristics of window contaminants.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
51/259	ATM (Attended and Unattended) EREP passes No's 33 & 34 ¹ M071, Sweat collections T003, M487, M563 VABD, PRD & CSM spectrometer readings Science Demonstration	1) Earth Terrain Camera used. Hand held photos of Great Salt Lake. General: a. ED52 spider "Anita" died. b. TV of Science Demonstration, electrostatic & magnetic effects. c. TV of crewman's eyes, ears, nose & throat. d. TV of entertainment center. e. Crew day off. f. Sleep cycle altered.
52/260	ATM (Attended and Unattended) EREP passes No's. 35 ¹ & 36 ¹ M071, M092, M093, M171, M131, M074, M151 S183, T003, M516, M561 VABD, PRD & CSM spectrometer readings	1) Earth Terrain Camera used.
53/261	ATM (Attended and Unattended) EREP pass No. 37 ¹ M071, M092, M093, M131, M133, M151 S183, T003, M560, M565 VABD, PRD & CSM spectrometer readings Science Demonstration	1) Earth Terrain Camera used. General: a. Sleep cycle altered. b. TV of Science Demonstration, paper airplane. c. TV of personal hygiene.

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Cont'd)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
54/262	ATM (Attended and Unattended) EREP passes No's. 38 ¹ & 39 ¹ M071, M092, M093, M131, M151, Girth measurements S183, T003, M558, M565, T053 ² VABD, PRD & CSM spectrometer readings	1) Earth Terrain Camera used. 2) Hand held photos of Laser beam obtained. General: a. TV of Pilot replacing tape in EREP recorder & cleaning of recorder. b. TV of M131, Spatial Localization test. c. Secondary electronic timer erratic
55/263	ATM (Attended and Unattended) EREP pass No. 40 M071, M092, M093 S063, S230 ¹ , M558, M556, T053 ² VABD, PRD & CSM spectrometer readings ED74, ED25 Science Demonstration ³	1) Photos taken of experiment thru STS window. 2) Visual observation of Laser beam. 3) Liquid diffusion. General: a. TV of ED74, mass measurement. b. JOP 13, observations of night sky objects, successful. c. S082B frame remaining counter failed to decrement, experiment terminated remainder of SL-3
55/264	ATM (Attended and Unattended) EREP pass No. 41 ¹ M071, M092, M093, M171, M133 S019 ⁴ , T003, T053 ² VABD, PRD & CSM spectrometer readings Science Demonstration ³	1) Earth Terrain Camera used. 2) Visual observation of Laser beam. 3) Ice melting in zero gravity. 4) Film cassette jammed. General: a. TV of press conference. b. S052 frame remaining counter failed to decrement

TABLE 2. SL-3 EXPERIMENT/SYSTEMS OPERATIONS (Concluded)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
57/265	ATM (Unattended) EREP ¹ M071, M151, M133 M566, T053 ² VABD, PRD & CSM spectrometer readings Environmental Microbiology ³ Iodine monitoring EVA 3 ⁴	1) EREP deactivation complete. 2) Crew unable to observe laser beam due to clouds. 3) Samples from hardware and atmosphere. 4) EVA activities. a) S149 micrometeorite impact cassettes retrieved. b) D024 thermal control coating panels retrieved. c) S230 inner collector assembly retrieved. d) Sample sail material retrieved. e) S052 camera/film replaced. f) S054 film replaced. g) S056 and H-Alpha 1 film retrieved.
58/266	ATM (Unattended) M071, M092, M093, M171, M110, M133, M151, sweat samples S019, S228 ¹ VABD, PRD & CSM spectrometer readings Orbital Assembly contamination assessment ²	1) One detector panel retrieved for return. 2) Crew comments describing molecular sieve vent. General: a. TV of M110, blood sampling. b. Gurgling sound attributed to erratic behavior of C&D console coolant system pump. c. Deactivation of SWS in progress.
59/267	ATM (Unattended) M071, M073	General: a. Deactivation of SWS in progress. b. Stowage of materials in the CM.
60/268	ATM (Unattended)	General: a. Closeout of SWS. b. Undock and splashdown.

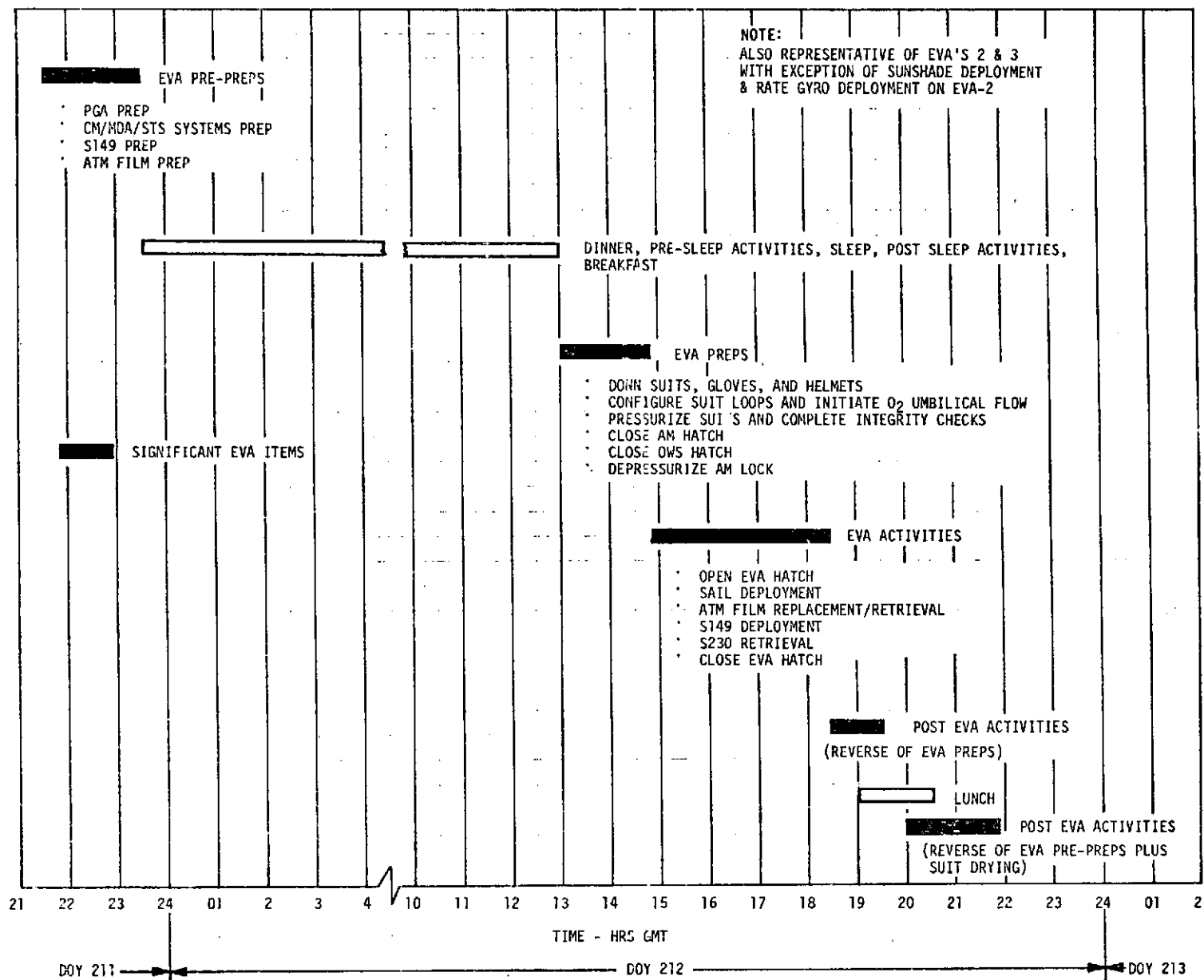


FIGURE 19. EVA NO. 1 - PLANNED

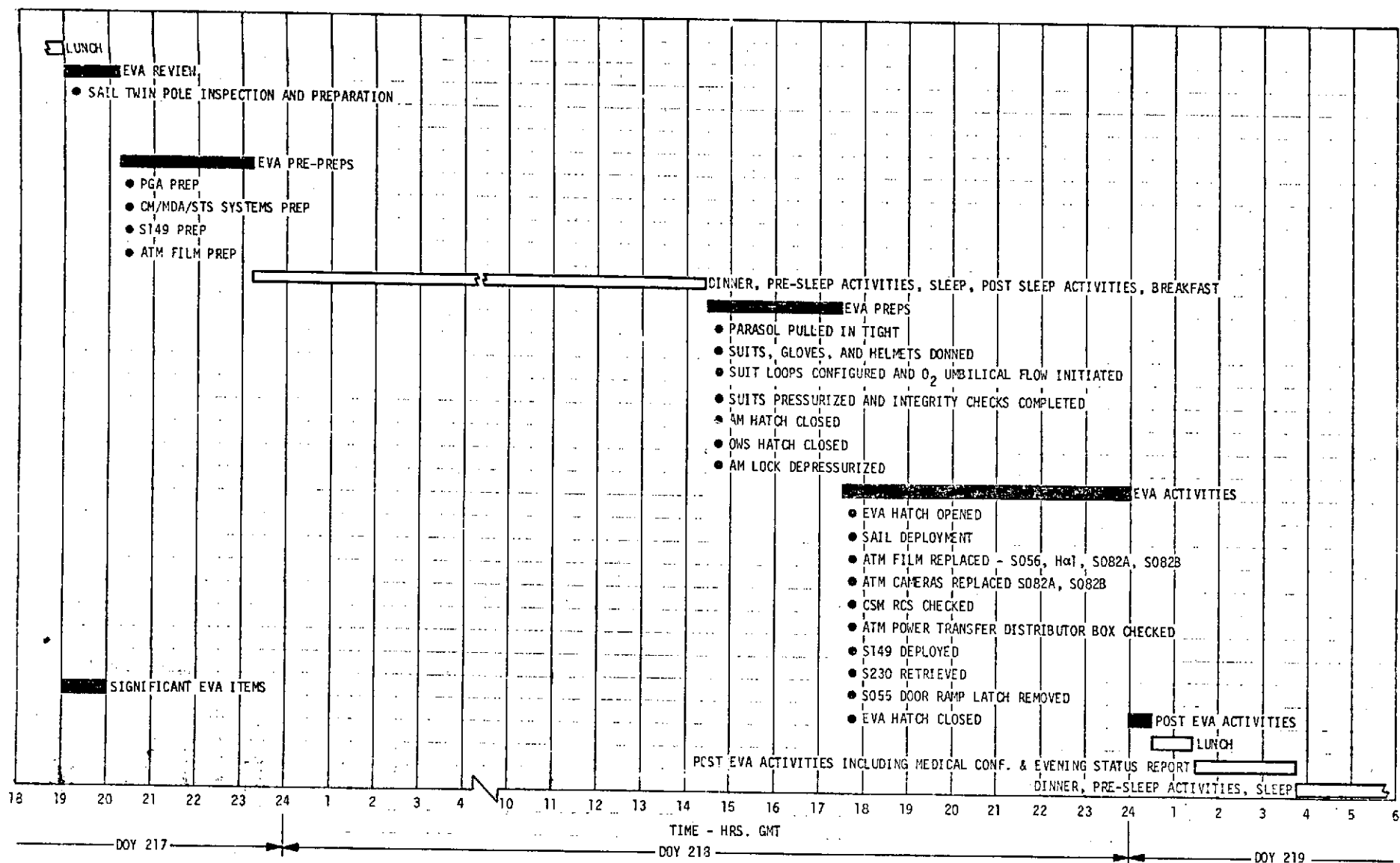


FIGURE 20. EVA NO. 1 - ACTUAL

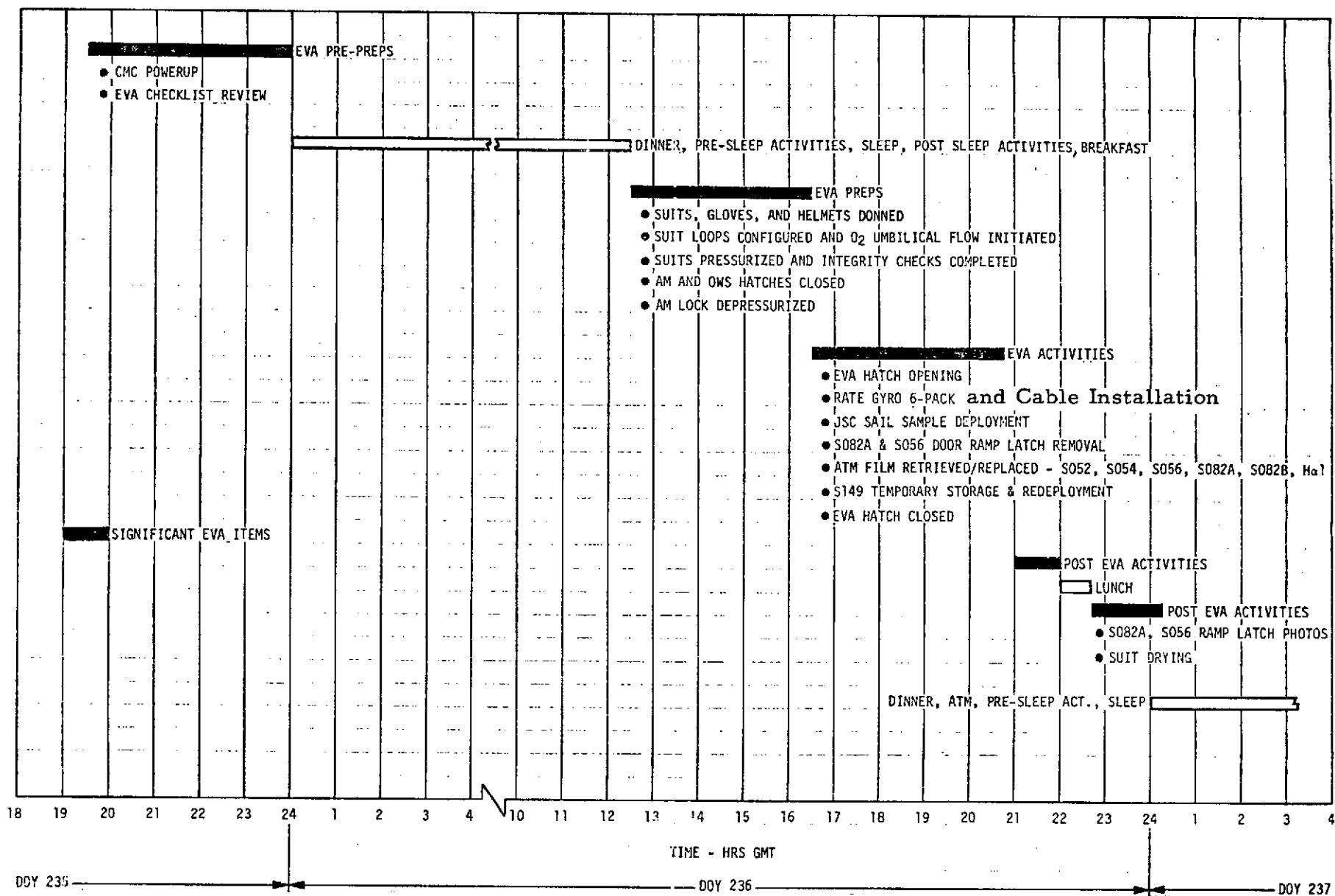


FIGURE 21. EVA NO. 2 - ACTUAL

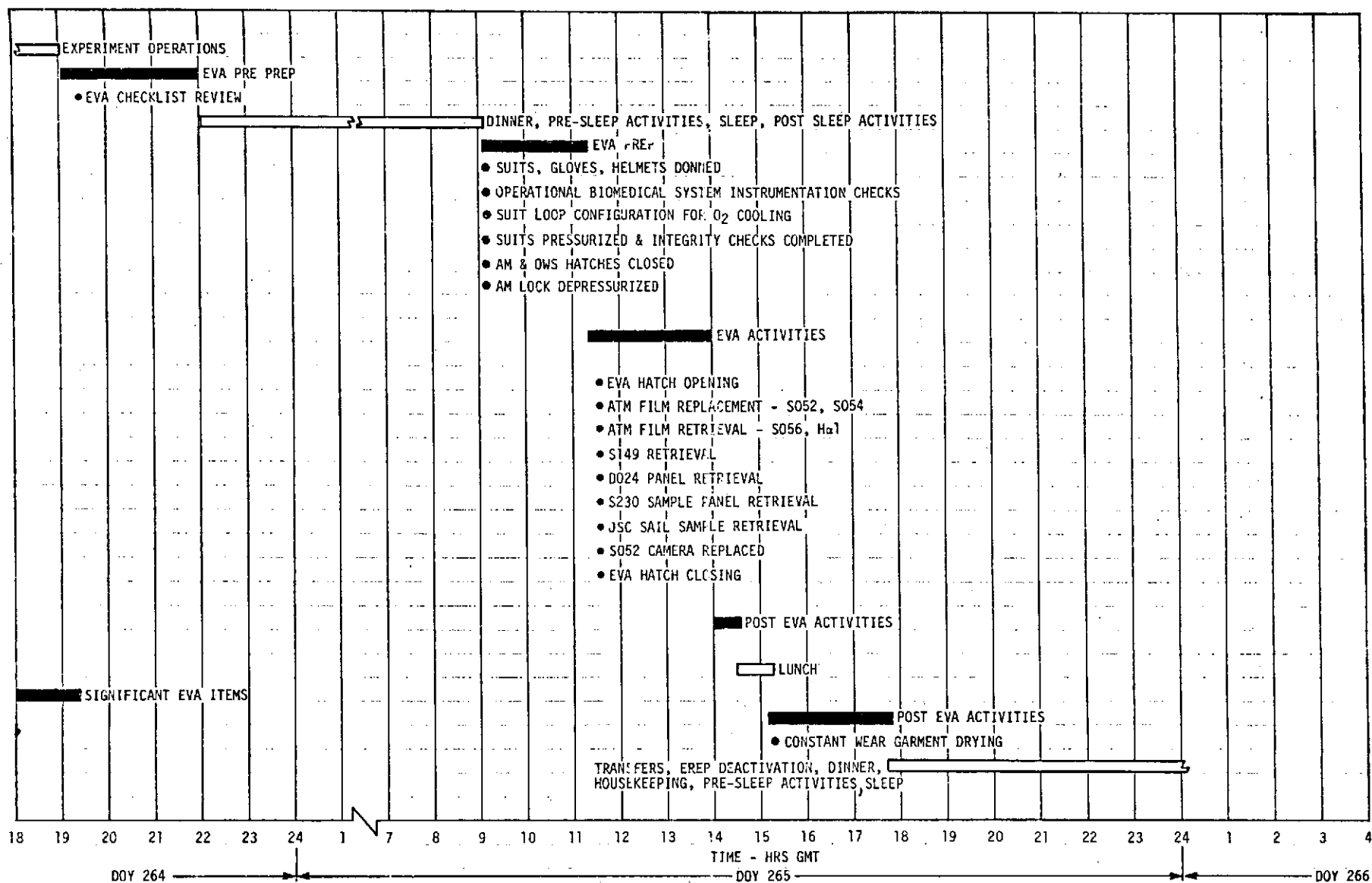


FIGURE 22. EVA NO. 3 - ACTUAL

SL-3 DEACTIVATION

The planned and actual SL-3 deactivation sequences are shown in Figures 23 and 24, respectively. The actual deactivation took place approximately 3 days later than planned because of the increased length of the mission.

Generally, the actual deactivation sequence was similar to the planned except more time was spent on CSM activation and checkout of the CSM RCS. No significant anomalies occurred during the deactivation of the SWS.

After undocking, the crew performed CSM maneuvers to acquaint themselves with the new procedures required during reentry.

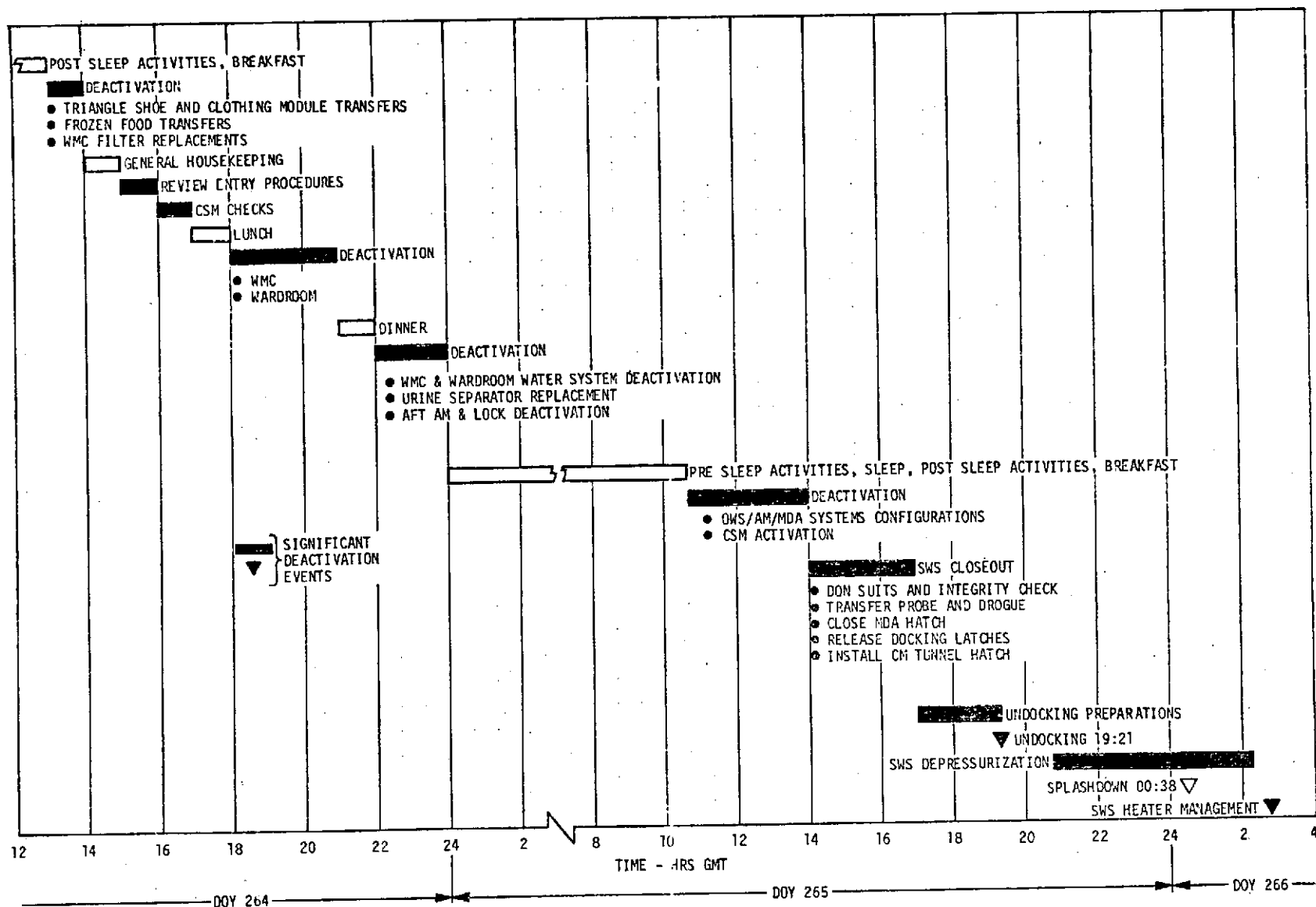


FIGURE 23. SL-3 DEACTIVATION - PLANNED

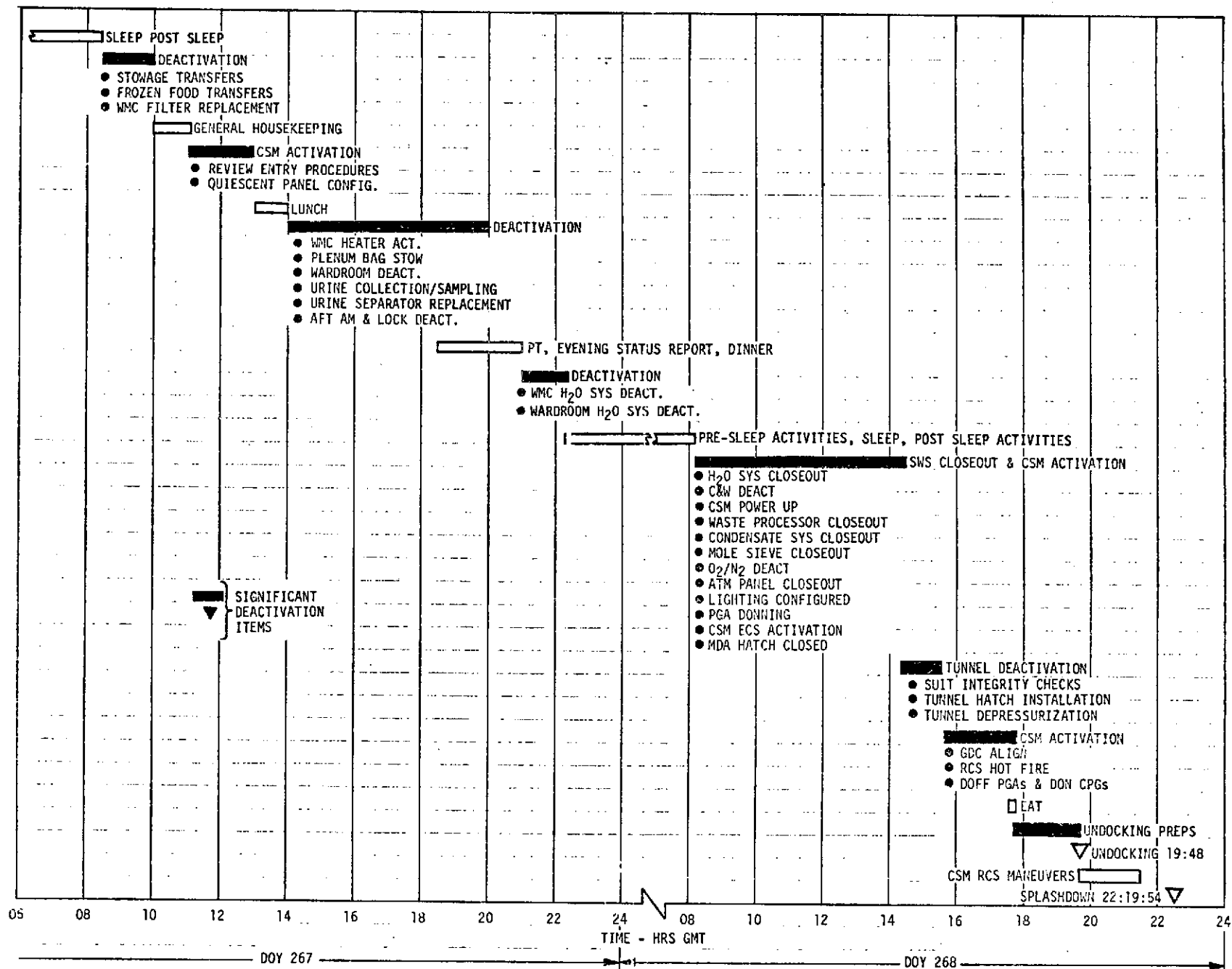


FIGURE 24. SL-3 DEACTIVATION - ACTUAL

SL-4

The Skylab 4 mission was launched November 16, 1973, at 14:01:23 GMT and terminated on February 8, 1974, at 15:16:55 GMT. The mission duration was 84 days, 1 hour, 15 minutes and 32 seconds. The SL-4 mission was increased to 84 days based on the success of the first two Skylab missions and the discovery of the comet Kohoutek and its prime viewing times. Since no "planned" SL-4 Flight Plan was issued between SL-3 and SL-4, only actual sequence data is presented for SL-4.

In general, the SL-4 mission was nominal except for a slower rate of acclimation to zero-g by the crew than was anticipated and the loss of control moment gyro (CMG) 1. The crew's slow acclimation to zero-g was attributed to overscheduling in the early stages of the mission.

Loss of CMG 1 required new control laws to be patched into the Apollo Telescope Mount Digital Computer (ATMDC) and new procedures to be followed by the crew during operations requiring maneuvers of the vehicle. At first, excessive TACS gas was used until the new procedures were developed. CMG 2 began showing signs of distress and great concern arose over its condition. This Attitude Control System situation threatened an early termination to the mission. CMG 2 bearing heaters were controlled from the ground to reduce the operating temperature band and CMG 2 was watched very closely with no maneuvers performed during periods when the CMG showed signs of distress.

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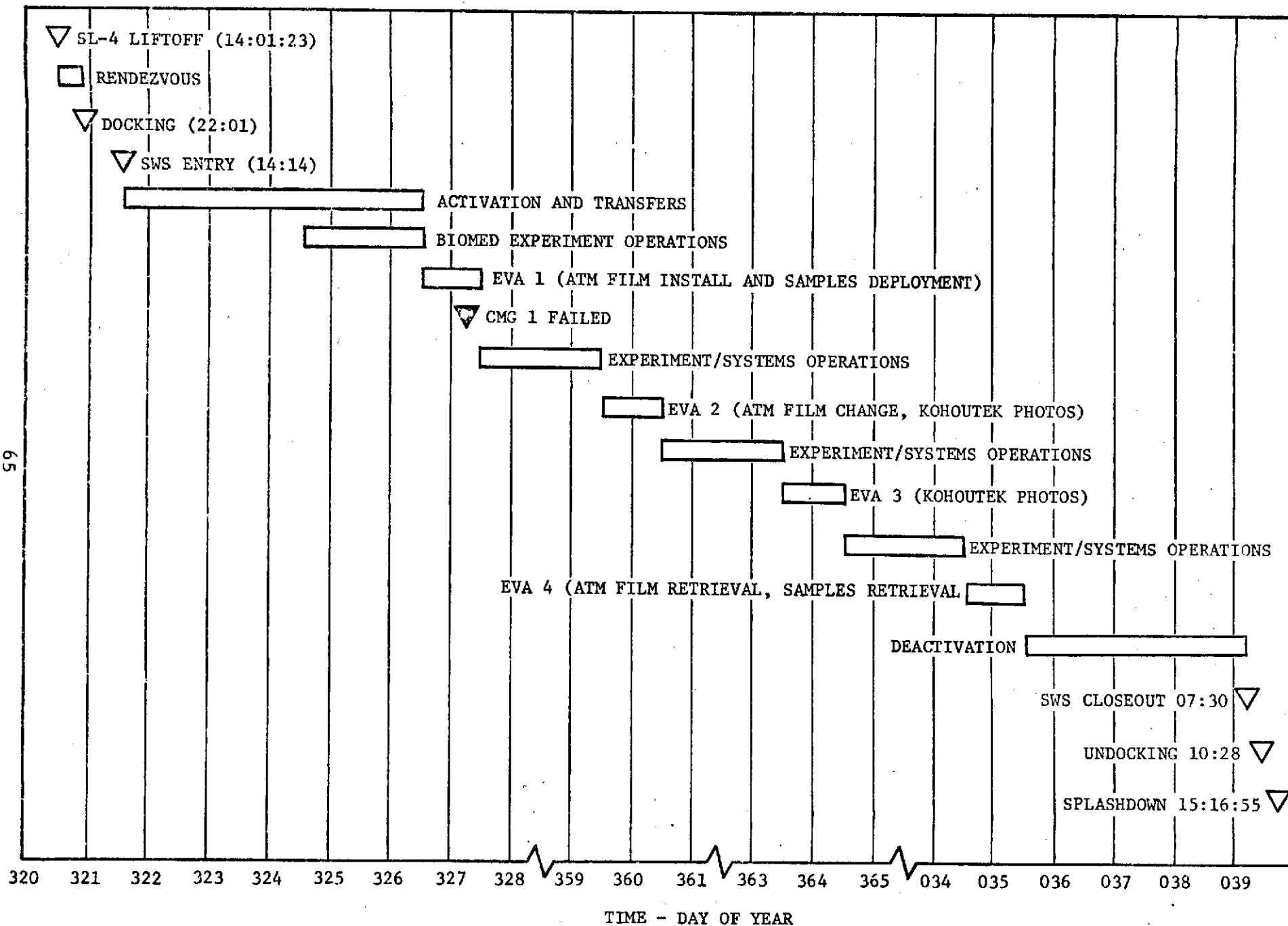


FIGURE 25. SL-4 SUMMARY - ACTUAL

SL-4 UNMANNED MISSION PHASE

Figure 26 presents the SL-4 Unmanned Mission Phase. The unmanned phase lasted 52 days with no significant anomalies occurring.

The SWS was depressurized normally. To provide six-pack cooling the SWS was repressurized to 5.0 psia about six hours after SL-3 splashdown. The pressure was allowed to decay at the normal leakage rate during the unmanned phase. The internal pressure was adjusted backup to 4.6 psia on DOY 297 and then allowed to decay again. Final depressurization to 0.8 psia and repressurization back to 5.0 psia occurred on DOY 318.

Nominal unmanned ATM experiment operations occurred until DOY 318 when the primary EPC Up/Down Rate Gyro Lock failed to release. Subsequent tests with the secondary EPEA indicated normal operations, but S052 and S055 data taking was curtailed until full EPC power up by the crew. S054 data taking continued as it does not require the EPC.

On DOY 307 CMG #1 wheel speed decreased in RPM and an increase in current and bearing temperature was noted. This condition lasted approximately three hours and then returned to normal.

Other off-nominal occurrences were the resumption of operation of the OWS Low Level Multiplexer B on DOY 300 (it had been intermittent since DOY 259), and intermittent operation of CBRM #17. CBRM #17 was only delivering power for about 10 minutes into the night and none during the day.

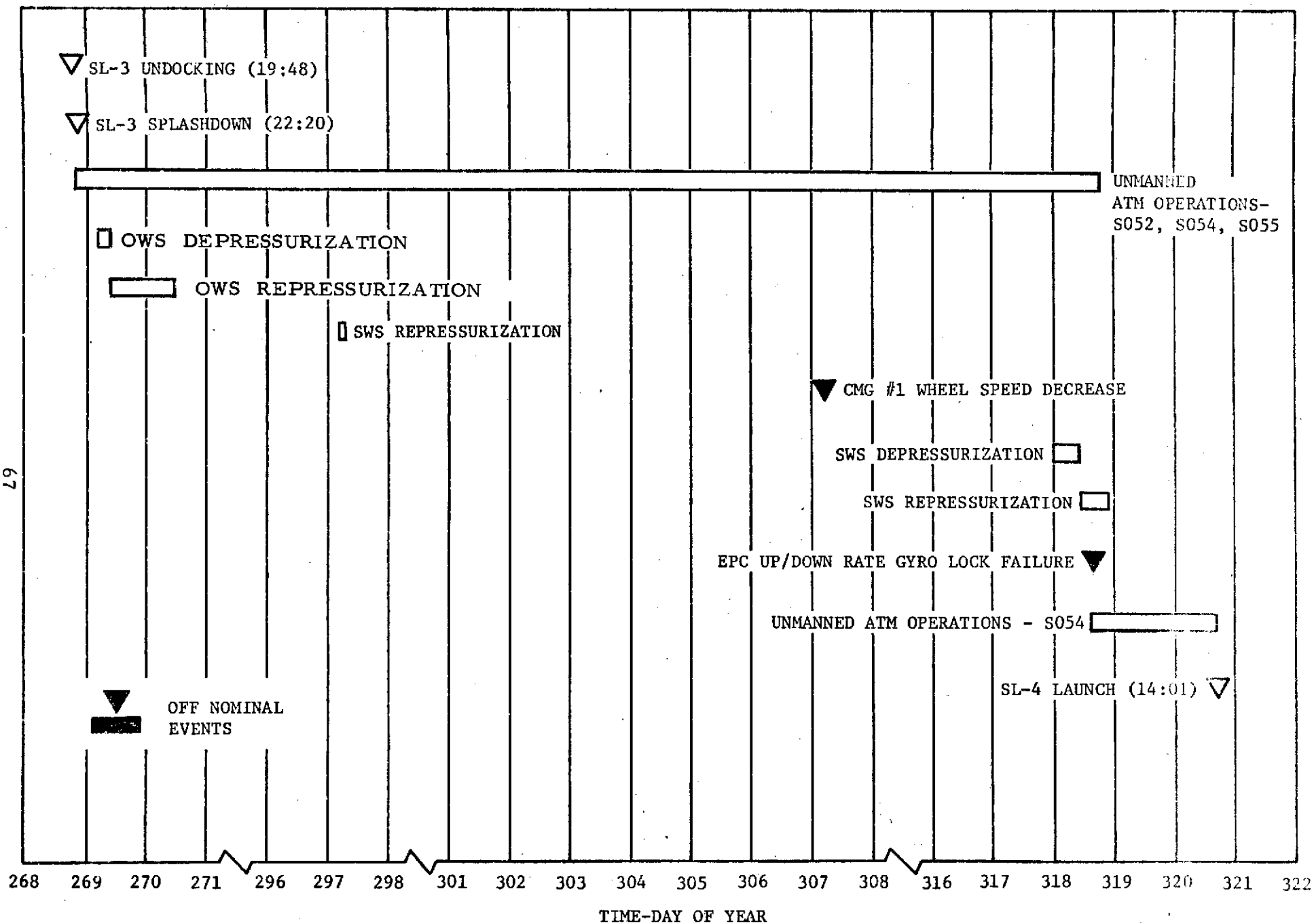


FIGURE 26. SL-4 UNMANNED PHASE OPERATIONS

SL-4 ACTIVATION

The actual activation sequence is shown in Figure 27.

Generally, activation of the SWS was accomplished without any major anomalies. The extension of the mission duration and resulting changes in mission requirements required new equipment to be carried up in the CSM. As a result, the transferring of items from the CSM to the SWS took longer than anticipated. This, coupled with "stomach awareness" problems reported by the crew, curtailed the completion of activation until DOY 324/MD5.

The existing state of the SWS dictated that modifications be made to certain on-board SWS systems. In particular, the AM primary coolant loop was re-serviced with coolanol and operation was resumed. Also, the Lower Body Negative Pressure Device vent was re-established to vent into the OWS waste tank instead of overboard, making it a non-propulsive vent.

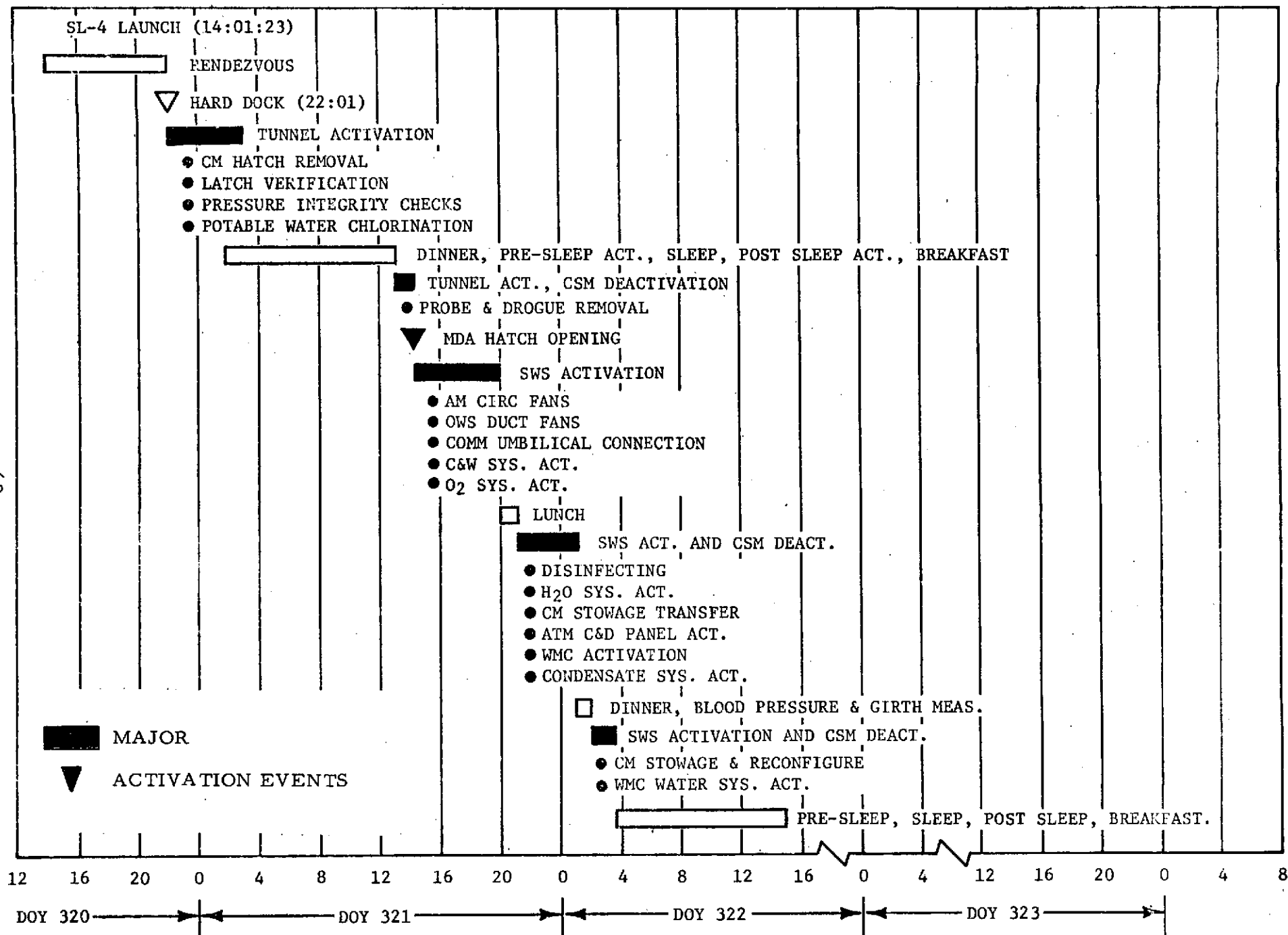


FIGURE 27. SL-4 ACTIVATION - ACTUAL

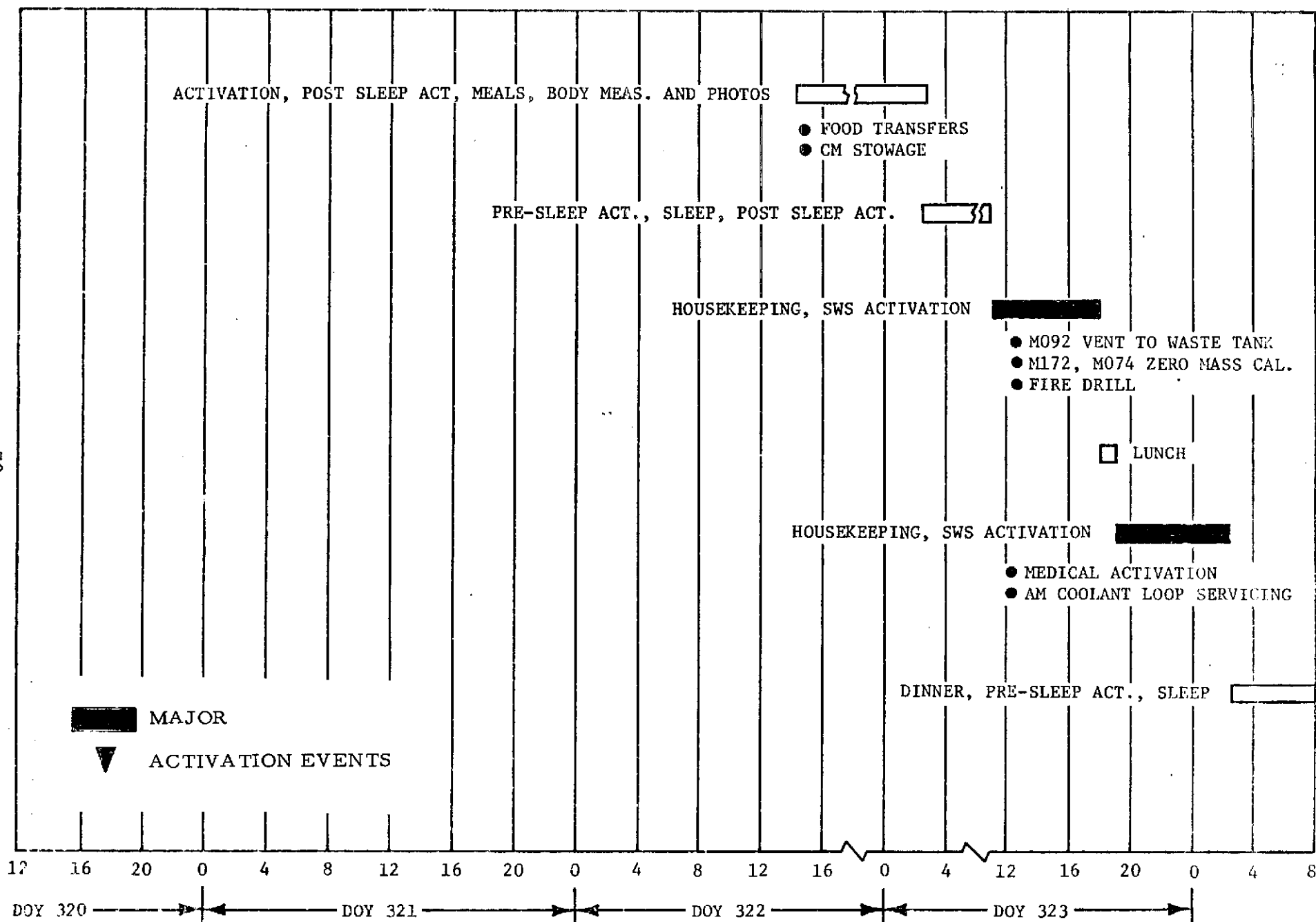


FIGURE 27. SL-4 ACTIVATION - ACTUAL (Concluded)

SL-4 EXPERIMENT/SYSTEMS OPERATIONS

The planned SL-4 mission called for 56 experiments, 26 science demonstrations, 13 student investigations, and 15 subsystem/operational detailed test objectives. In addition, observations of the comet Kohoutek using hardware from six of the onboard corollary experiments and the six Apollo Telescope Mount experiments were planned. The science demonstrations were to be performed at the crew's option. Data were obtained on all but three of the planned detailed test objectives, but the crew was able to schedule only 11 of the original science demonstrations. Data were obtained on 11 of the student investigations. In addition, data were obtained on five additional subsystem/operational detailed test objectives.

The solar scientific airlock was still occupied by the parasol, prohibiting its use for corollary experiments. A special camera, S201 (Extreme Ultraviolet Electronographic Camera), for observing the comet Kohoutek was used on SL-4. No major experiment hardware malfunctions occurred which were not resolved with crew malfunction procedures.

Table 3 shows the experiment operations and crew activities on a daily basis. Remarks are also included to explain an activity or note an anomaly.

The crew performed 4 extravehicular activities (EVA) for a total time outside the vehicle of 22 hours 18 minutes. The third EVA was devoted entirely to taking photographs of the comet Kohoutek and the sun. During the second and fourth EVA, one crewman developed a leak in his suit water Q. D. Neither instance was severe enough to require the crewman to go to gas cooling; liquid cooling was used for all EVAs. Figures 28, 29, 30, and 31 present the sequences for EVA 1, 2, 3, and 4 respectively.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
1/320	ATM (Unattended) MO71/MO73 VABD, PRD, & CSM spectrometer readings ED 63 ¹	1) ED 63 deployed. General: a. Hard dock on third (3) attempt. b. Pilot suffered nausea.
2/321	SWS activation, CSM deactivation ATM (Unattended) MO71, MO92 ¹ ED63 ² VABD, PRD, & CSM spectrometer readings	1) Leg and blood pressure measurements only. 2) Removed from CM window. General: a. CDR and PLT had occasional stomach awareness. b. Inadvertent water dump during activation. c. TV63 (MDA activation).
3/322	SWS activation ATM (Unattended) MO71, MO92 ¹ , M110, M133 VABD, PRD, CSM spectrometer readings	1) Leg and blood pressure measurements only. General: a. CDR and PLT still report stomach awareness. b. Nasal congestion noted. c. Exercise began.
4/323	SWS activation ¹ ATM (Unattended) MO71, MO92 ³ , MO74 ² , M172 ² T003 VABD, PRD, CSM spectrometer readings ED76 (Neutron Analysis) SD34 (Neutron Environment)	1) AM primary coolant loop reservicing. MO92 vented to waste tank. 2) Zero mass calibrations. 3) Leg and blood pressure measurements only. General: TV72 (coolant loop servicing).

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
5/324	ATM (Unattended) M071, M092 ¹ /M093/M171, M110, M133, M151 T003 VABD, PRD, CSM spectrometer, RSM (Radiation Survey Meter) readings Sweat samples, girth measurements, body photos Limb blood flow measurements Gypsy moth eggs deployment	1) Leg and blood pressure measurements only on SPT. Regular perf. on CDR and PLT. First M092 vent into waste tank. General: a. 16mm DAC failed. b. ATM C&D coolant loop flow erratic. c. Crew reported atmosphere too dry.
6/325	ATM (Unattended) EREP ¹ M071, M092/M093/M171, M131 ² , M151 T003, S149 ³ , T025 ⁴ VABD, PRD, CSM spectrometer readings Window contamination observations/photos CO monitoring	1) S191 door checkout. 2) Motion sensitivity test only. 3) S149 preparation only. 4) T025 preparation only. General: a. Gypsy moth eggs observed. b. Rate gyro integral test failure. c. LCGs for EVA discovered to have mildew.
7/326	ATM (Unattended) EREP ¹ M071, M151 S149 ² , S228 ² , D024 ² , S230 ² , T025 ² VABD, PRD, CSM spectrometer readings EVA ³	1) Hand held photos of: a) Yucatan, b) Near East, c) AFAR triangle. 2) Deployed during EVA. 3) EVA activities: a) See 2) above. b) S193 antenna pinned at zero degrees pitch. c) S056, S082A, S082B, H&I film installed. d) H&2 door pinned. e) Twin sail sample deployed. f) T025 Nikon camera malfunctioned, T025 re-stowed in airlock.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
8/327	ATM (Unattended) M071, M131 T003, S233 ¹ VABD, PRD, CSM spectrometer readings	1) First photos of comet "Kohoutek." General: a. CMG No. 1 failed. b. T025 Nikon camera operated normally. c. Primary AM coolant loop turned off.
9/328	ATM (Unattended) M071 T003, S233, S063 VABD, PRD, CSM spectrometer readings	General: a. Crew day off. b. Trim burn occurred satisfactorily.
10/329	ATM ¹ (Unattended) EREP ² M071, M092 ³ , M093, M151 T003, S233, S019K ⁴ , S183 ⁵ VABD, PRD, CSM spectrometer readings ED41	1) ATM TV monitor replaced. S082 auxiliary timer installed. 2) EREP system checked out. 3) LBNP terminated early on pilot. 4) Articulated mirror replaced. 5) Data Acquisition Camera optics replaced. General: a. ATM C&D coolant loop flow reading low. b. TV of S192 alignment.
11/330	ATM ¹ (Manned and Unattended) M071, M092, M093, M151, M133, M074 ² , M131 T003, S019, S009 ³ , S201K, S233 VABD, PRD, CSM spectrometer readings ED63	1) S054 operations limited following filter wheel malfunction. 2) Experiment calibrated (1st part). 3) Nuclear emulsion detector package installed and initiated. Drive motor replaced. General: a. TV of crew eating. b. Girth measurements and crew IR photos taken.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
12/331	ATM (Manned and Unattended) M071, M151, M074 ¹ , M131 T003, S232 ³ , S233 VABD, PRD, CSM spectrometer readings Atmospheric Volatile Concentrator ²	1) Experiment calibrated (Final part). 2) Sample of SWS environment obtained. 3) Excessive TACS used while returning to SI attitude. General: TV of Pilot exercising on treadmill.
13/332	ATM (Manned and Unattended) EREP ¹ M071, M092, M093, M171, Blood Flow ² T003, M487, S233 VABD, PRD, CSM spectrometer readings	1) Hand held photos of: a) Inland delta of Niger River and b) Vegetation patterns in Argentina. 2) Performed by Commander and Pilot. General: a. Frost removed from wardroom window. b. TV of S054 film canister reloading. c. TV of crew eating. d. SIA 133 failed.
14/333	ATM (Manned and Unattended) EREP Pass No. 3 ¹ M071, M092 ⁴ , M093, M171, Blood Flow ² T003, S183, M487, T053 ³ , S233 VABD, PRD, CSM spectrometer readings	1) First pass of this mission. Earth Terrain Camera used. Pass conducted in SI mode. EDDU data not received by ground. 2) Performed by Science Pilot. 3) Visual observation of laser beam unsuccessful. 4) Test terminated early on Science Pilot.
15/334	ATM ¹ (Manned and Unattended) EREP Pass No. 4 ² M071, M092 ³ , M093, M133, M131 T003, S183 ⁵ , T053 ⁴ , S233 VABD, PRD, CSM spectrometer readings	1) EPC UP/DN orbital lock failed to release. 2) Earth Terrain Camera used. EDDU used successfully. 3) Facial photos and leg blood pressure measurements taken on Pilot. 4) Unaided, visual observation of laser beam unsuccessful. 5) Data Acquisition camera malfunctioned. Piece of glass floated from carousel. General: a. TV of S183 preparation. b. SWS vibration reported by crew. c. SIA 131 replaced. d. ATM C&D coolant flow dropped twice.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
16/335	ATM (Manned and Unattended) EREP Pass No. 5 ¹ M071, M092 ² , M093, M131 T003, T053 ³ , S233 VABD, PRD, CSM spectrometer readings	1) Earth Terrain Camera used. 2) Facial photos and leg blood pressure measurements taken on Commander. 3) Experiment conducted successfully. General: TV of OWS air mixing screen cleaning.
17/336	ATM (Manned and Unattended) EREP Pass No. 6 ¹ and 7 ¹ M071 T003, S233 VABD, PRD, CSM spectrometer readings	1) Earth Terrain Camera used. General: a. Crew day off. b. TV of crew activities.
18/337	ATM (Manned and Unattended) EREP Pass No. 8 ¹ and 9 ¹ M071/M073, M092 ² , M093 T003, M487, T053, S233 VABD, PRD, CSM spectrometer readings Iodine monitoring	1) Earth Terrain Camera used. 2) Leg blood pressure measurements taken on Science Pilot. General: a. TV of water sampling. b. Crew reports spot appeared on S052 TV image.
19/338	ATM (Manned and Unattended) ¹ EREP Pass No. 10 ² M071/M073, M092, M093, M171, M131 T003, M487, T053, S233, S019 VABD, PRD, CSM spectrometer readings Gypsy moth monitoring, iodine monitoring ED63 ³	1) S082A thermal shield door failed to open. 2) S190A cameras malfunctioned. Earth Terrain Camera used. 3) Plants observed to be dead. General: a. Mark I exerciser malfunctioned. b. TV28 - ATM conference.
20/339	ATM (Manned and Unattended) ¹ EREP Pass No. 11 ² M071/M073, M092, M093, M171, M133, M151 T003, S063K, S201K, S233 VABD, PRD, CSM spectrometer readings	1) S082A door malfunction. 2) Earth Limb Data - Earth Terrain Camera used. General: a. CMG #2 exhibited off nominal behavior. b. Mark I exerciser was repaired.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
21/340	ATM (Manned and Unattended) M071/M073, M092, M093, M171, M110 T003, M487, T053, S233, S183, S183K VABD, PRD, CSM spectrometer readings ED63 ¹ Science Demonstration 35 (Charged particle mobility)	1) Experiment terminated due to death of plants. General: a. S190A forward motion compensator adjustment performed by crew. b. Malfunction procedures conducted on three cameras. Two remained inoperative. c. Crew reported black streak appeared on S052 TV image. d. TV of M110 blood sampling.
22/341	ATM (Manned and Unattended) EREP Pass No. 12 ¹ M071/M073, M092 ² , M093, M151 ³ T003, S233, S019K VABD, PRD, CSM spectrometer readings	1) Earth Terrain Camera used. 2) Facial photos and leg blood pressure measurements taken on pilot. 3) DAC 04 failed. General: a. TV of South America thru view-finder tracking system. b. 16mm DAC 02 failed.
23/342	ATM (Manned and Unattended) EREP PASS No. 14 ¹ , EREP Lunar calibration ² M071/M073, M092 ³ , M093 T003, S009, S019, S063K VABD, PRD, CSM spectrometer readings	1) Earth Terrain Camera used. 2) Crew found filters were missing from S190A cameras. Crew failed to use Earth Terrain Camera. 3) Facial photos, blood pressure and leg volume measurements taken on Science Pilot. General: a. Polaroid camera failed. b. DAC 09 film transporter 5 failed. c. CMG 2 showed slight performance discrepancy. d. ATM Solar Array voltage dropped then returned to normal.
24/343	ATM (Manned and Unattended) ¹ M071/M073, M092 ² , M093 T003, S009, S063K, S073 VABD, PRD, CSM spectrometer readings	1) Pointing stability test successfully conducted. S082 door anomaly. 2) Facial photos, blood pressure and leg volume measurements taken on commander. General: a. Polaroid camera repaired. b. ATM C&D coolant loop flow drop.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS. (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
25/344	ATM (Manned and Unattended) ¹ M071/M073, M133 ² M487, T003, S063K VABD, CSM spectrometer readings	1) HCO Calroc launched successfully. 2) Pre-amplifier cable replaced. General: a. CMG 2 showed slight performance discrepancy. b. DAC 04 tested satisfactorily.
26/345	ATM (Manned and Unattended) M071/M073, M131, M171, M093, M092 T003, S063, S201K, S233K VABD, PRD, CSM spectrometer readings	
27/346	ATM (Manned and Unattended) M071/M073, M131, M171, M093, M092 T003, S009, S183, S201, S233K, M487 VABD, PRD, CSM spectrometer readings	General: Trim burn occurred on schedule.
28/347	ATM (Manned and Unattended) ERE ¹ M071/M073, M131, M171, M093, M092 T003, S183 ² , M487, S019K, S183K, S233K VABD, PRD, CSM spectrometer readings	1) Hand held photos and visual observations. 2) Carrousel malfunction occurred. General: a. Low flow occurred in ATM C&D coolant loop. b. S082B mirror oscillating. c. TV of crewmen brushing teeth, shaving, washing, etc.
29/348	ATM (Manned and Unattended) ERE ¹ Pass No. 15 M071/M073, M093, M092, M151 T003, M509 ² , S019K, S233K VABD, PRD, CSM spectrometer readings	1) Hand held photos. Earth Terrain Camera used. 2) Preparation only. General: a. TV of S019. b. One of CSM Quad B fuel valves leaking.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
30/349	ATM (Manned and Unattended) EREP ¹ MO71/MO73, MO93, MO92, M133, M151 T003, S063, M509, S233K VABD, PRD, CSM spectrometer readings	1) Earth Terrain Camera used. Hand held photos and verbal descriptions. General: a. CMG 2 anomaly occurred. b. Five Gypsy moths hatched. c. DAC 01 jammed. d. Crew temporarily "locked out" of Digital Address System. e. Pilot reported fullness of left ear. f. TV of M509.
31/350	ATM (Manned and Unattended) EREP ¹ MO71/MO73, MO93, MO92 T003, S063, S233K, S019K, S201K VABD, PRD, CSM spectrometer readings Stereophotogrammetry, anthropometric measurements	1) Hand held photos only. General: S054 X-Ray image cathode ray tube failed to display image on 40% of screen.
32/351	ATM (Manned and Unattended) EREP Pass No. 13 MO71/MO73 T003, S233K, S063K VABD, PRD, CSM spectrometer readings	General: a. Crew day off. b. TV of crew removing foot restraints at wardroom table.
33/352	ATM (Manned and Unattended) EREP Pass No. 17 MO71/MO73, MO93, MO92, M171 T003, S183, M487, S233K, S183K VABD, PRD, CSM spectrometer readings Gypsy moths observation	General: a. TV of Gypsy moths. b. CMG 2 anomaly. c. Condensate holding tank dumped. d. Gas removed from ATM C&D coolant system. e. Camera transporter 03 jammed.
34/353	ATM (Manned and Unattended) MO71/MO73, MO93, MO92, M171, M151 T003, M487, T025 ¹ , S063 ¹ , M509 ² , S232, S019K VABD, PRD, CSM spectrometer readings Iodine concentration ³	1) Malfunction procedures conducted. 2) Preparation only. 3) Checked water chiller sample ports. General: a. Commander reported noise exterior to CSM. b. CMG 2 anomaly. c. DAC transporter 03 repaired. d. Primary AM coolant loop turned ON.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
35/354	ATM (Manned and Unattended) M071/M073, M093, M092, M171, M151, M133 T003, M487, S019, M509, S233, S063K VABD, PRD, CSM spectrometer readings	General: TV of Kohoutek instruments.
36/355	ATM (Manned and Unattended) M071/M073, M131 T003, S073, M557, S233, S063K VABD, PRD, CSM spectrometer readings	General: a. TV of Earth surface. b. CMG 2 anomaly.
37/356	ATM (Manned and Unattended) EREP ¹ M071/M073, M092 T003, M487, S201, M557, S233, S063K VABD, PRD, CSM spectrometer readings Girth measurements and crew profile photos	1) Only Earth Terrain Camera used. General: AM transmitter "C" failed to turn on.
38/357	ATM (Manned and Unattended) M071/M073, M092, M110, M151 T003, M509, S019 ¹ , M557, S233, S201K VABD, PRD, CSM spectrometer readings ED41, ED72	1) Film canister 002 failed.
39/358	ATM (Manned ¹ and Unattended) M071/M073, M092 T003, S233 VABD, PRD, CSM spectrometer readings	1) Crew observed partial solar eclipse. General: a. TV of crew's Xmas tree and the crew. b. S019 film magazine 002 jammed.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
40/359	ATM (Manned and Unattended) M071/M073 T003 VABD, PRD, CSM spectrometer readings EVA ¹	1) EVA activities: a) Film replaced in S052, S054, S056, S082A, H Alpha 1. b) S082A thermal shield door pinned open. c) S054 filter wheel moved to filter 3 position permanently. d) S149 cassette retrieved. e) S020 photos of Sun obtained. f) S201K photos of comet obtained. g) T025K photos of comet obtained. General: a) 3869 lb-sec TACS used. b) CDR's PCU leaked during EVA, water depleted from SUS 1 tank.
41/360	ATM (Manned and Unattended) EREP ¹ M071/M073, M133 T003, M487, M560 VABD, PRD, CSM spectrometer readings	1) Only Earth Terrain Camera used. General: a. Crew day off. b. TV of crew day off activities.
42/361	ATM (Manned and Unattended) M071/M073, M092, M093, M171, M074 T003, S073, M560, M561 VABD, PRD, CSM spectrometer readings Taste and aroma evaluation	General: a. Star Tracker failed. b. Pin broke at TV input station. c. CMG 2 anomaly occurred.
43/362	ATM (Manned and Unattended) EREP ¹ M071/M073, M092, M093, M171 T003, S073, M561 VABD, PRD, CSM spectrometer readings Taste and aroma evaluation	1) Hand held photos only of Alpine fault in Circum-Pacific Fault Zone. General: TV of Kohoutek conference.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
44/363	ATM (Manned and Unattended) M071/M073, M151 T003, M561, M563 VABD, PRD, CSM spectrometer readings ED41 EVA ¹	1) EVA activities: a) S020 photos of Sun obtained. b) S201K photos of comet obtained. c) T025K photos of comet obtained. d) Retrieve SEVA sail sample. General: a. TV of "Comet Sketches." b. 3864 1b-sec TACS used.
45/364	ATM (Manned and Unattended) EREP ¹ M071/M073, M092, M093, M110 T003, S019, M563 VABD, PRD, CSM spectrometer readings	1) Hand held photos of San Andreas Fault, Northern Baja California and central Arizona linear features. General: a. S082B thermal shield door failed. b. Pin repaired at TV input station.
46/365	ATM (Manned and Unattended) M071/M073, M092, M093, M133 T003, S183, M487, S063, T002, M563, M566 VABD, PRD, CSM spectrometer readings Carbon monoxide monitor	General: a. TV of ocean currents. b. TV of Kohoutek instruments.
47/001	ATM (Manned and Unattended) EREP Pass No. 18 M071/M073, M092, M093, M131 S073, S063 VABD, PRD, CSM spectrometer readings Iodine monitoring	General: a. TV of Kohoutek instruments. b. Crew sleep time altered one hour (change to Daylight Saving Time).
48/002	ATM (Manned and Unattended) EREP ¹ M071/M073, M172 S063K, S201K, S019 ² , T002 VABD, PRD, CSM spectrometer readings	1. Hand held photos only. 2. AMS articulated mirror system anomaly. General: a. CMG 2 anomaly occurred. b. ATM C&D coolant system flow erratic. c. TV of press conference and comet sketches. d. Crew day off.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
49/003	ATM (Manned and Unattended) ¹ EREP Pass No. 19 M071/M073, M092, M093, M131, M171 VABD, PRD, CSM spectrometer readings Taste and aroma evaluation ED31 Science Demonstration ³	1) C&D console integral lighting lost. S082B failed to point correctly. 2) Carrousel malfunctioned. 3) Demonstration of behavior of immiscible liquids in zero gravity. General: a. CMG 2 anomaly. b. TV of Science Demonstration.
50/004	ATM (Manned and Unattended) EREP Pass No. 20 M071/M073, M092, M093, M151, M171 S019K, S183, T003, T053, M516, M566 VABD, PRD, CSM spectrometer readings ED31 Science Demonstration ¹	1) Demonstration of fluid mechanics. General: TV of Science Demonstration and Comet sketches.
51/005	ATM (Manned and Unattended) M071/M073, M092, M093, M133, M171 S019, S063K, S183, T003, M566, M562 VABD, PRD, CSM spectrometer readings ED31 Science Demonstration ¹	1) Demonstration of Fluid Mechanics and Rochelle Salt Growth. General: a. TV of Science Demonstration. b. Intermittent stoppage of the urine dump system reported.
52/006	ATM (Manned and Unattended) EREP Pass No. 21 M071/M073, M133 ¹ T002, S063, S063K, T003, S201K, M562, M566 VABD, PRD, CSM spectrometer readings Sweat sample ² , Girth and height measurements, crew profile photos ED31	1) Telemetry lost after 2 hours. 2) Pilot was subject. General: a. OWS lighting reduced 50 percent. b. TV of Comet sketches.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
53/007	ATM (Manned and Unattended) EREP Pass No. 22, Lunar Calibration, S19 calibration M071/M073, M151, M092, M093 T002, S019 ¹ , T053 ² , T003, S019K, M566 VABD, PRD, CSM spectrometer readings Blood flow in limbs ³ , Sweat samples ⁴ ED31, ED61/62	1) Film cassette jammed. 2) Test unsuccessful. 3) Data on Pilot. 4) Taken on Commander. General: CMG 2 anomaly.
54/008	ATM (Manned and Unattended) EREP Pass No. 23 M071/M073, M092, M093 T002, S019, T053 ¹ , T003, S019K, M556, S063K, S233K VABD, PRD, CSM spectrometer readings Blood flow in limbs ² ED61/62	1) Test successful. 2) Data on Scientist Pilot.
55/009	ATM (Manned and Unattended) EREP Pass No. 24 M071/M073, M092, M093 T002, S063, S183K, T003, S063K, S233K VABD, PRD, CSM spectrometer readings Blood flow in limb ¹ , girth & height measurements and crew profile photos Gypsy moth ² ED61/62 Science Demonstration ³	1) Data on Commander. 2) Two eggs hatched. 3) Demonstration of gyroscopic effects. General: a. Y3 rate gyro low amplitude oscillations occurred. b. TV of Science Demonstration.
56/010	ATM (Manned and Unattended) EREP Pass No. 25 M071/M073, M133 T002, S201, S201K, T003, S233K VABD, PRD, CSM spectrometer readings ED61/62	General: Crew day off.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
57/011	ATM (Manned and Unattended) EREP Pass No. 26 M071/M073, M171, M092, M093 T003, S183, S183K, S019K ¹ , S233, M487 VABD, PRD, CSM spectrometer readings Girth & height measurements, crew photos Gypsy moths ² ED61/62 Science Demonstration ³	1) Film canister 003 broke, experiment inoperative. 2) Six eggs hatched. 3) Demonstration of liquid floating zone. General: TV of Science Demonstration.
58/012	ATM (Manned and Unattended) EREP Pass No. 27 M071/M073, M171, M092, M093, M151 T003, M487, S201, S201K, S063K, S233K VABD, PRD, CSM spectrometer readings Girth & height measurements, crew photos ED72 ¹ Science Demonstration ²	1) Experiment failed. 2) Demonstration of liquid floating zone. General: a. S019 film canister repaired, experiment operational. b. TV of Science Demonstration.
59/013	ATM (Manned and Unattended) M071/M073, M171, M092, M093, M110 T002, T003, T053 ¹ , S063K, S183, S233K VABD, PRD, CSM spectrometer readings Girth & height measurements ED61/62 Science Demonstration ²	1) Test unsuccessful. 2) Demonstration of liquid floating zone. General: a. CMG 2 anomaly. b. TV of Science Demonstration and ED61/62.
60/014	ATM (Manned and Unattended) EREP M071/M073, M092, M093, M131 M487, S019K, S201, S233, T003 VABD, PRD, CSM spectrometer Iodine monitoring Science Demonstration	1) Demonstration of liquid floating zone. General: a. Crew exceeded SL-3 space flight duration record. b. CMG 2 anomaly. c. TV of Science Demonstration.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
61/015	ATM (Manned and Unattended) M071/M073, M092, M093 T020, T053, T003, M516 VABD, PRD, CSM spectrometer readings ED61/62 Science Demonstration ¹	1) Demonstration of liquid floating zone. General: a. TV of Science Demonstration, T020 operation and out-the-window coverage of Earth surface features. b. CMG 2 anomaly. c. H Alpha 1 anomaly. d. New cooler-detector installed in S192. e. H Alpha 1 TV picture degrading. f. NRL Calroc successfully launched.
62/016	ATM (Manned and Unattended) M071/M073, M092, M093, M110, M131 T003, T053 VABD, PRD, CSM spectrometer readings	General: a. CMG 2 anomaly. b. H Alpha anomaly cleared. c. Two pumps operating in AM primary coolant loop & 1 in secondary loop due to high beta angles. d. TV of Earth surface features.
63/017	ATM (Manned and Unattended) M071/M073, M092, M093, M171, M151 T003, T053, M509 ¹ VABD, PRD, CSM spectrometer readings ED61/62	1) Terminated early due to low battery voltage. General: a. CMG 2 anomaly. b. AM transmitter B lost temporarily. c. H Alpha 1 film frame counter and ready light failed to indicate properly. d. TV of M509 run.
64/018	ATM (Manned and Unattended) EREP ² Pass No. 30 M071/M073 T003 VABD, PRD, CSM spectrometer readings Science Demonstration ¹	1) Demonstration of fluid mechanics. 2) S190A, S192 & S193 equipment anomalies occurred. General: a. CMG 2 anomaly. b. TV of Science Demonstration. c. Crew day off.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
65/019	ATM (Manned and Unattended) M071/M073, M092, M093, M171, M151 T003, M487, S063, S073 VABD, PRD, CSM spectrometer readings	General: a. CMG 2 anomaly. b. AM tape recorder failed. c. TV of Earth surface features. d. S019 AMS anomaly.
66/020	ATM (Manned and Unattended) EREP Pass No. 32 M071/M073, M092, M093, M151, M171 T003, M509, S073 VABD, PRD, CSM spectrometer readings	General: a. CMG 2 anomalies. b. AM tape recorder replaced. c. TV of M509 run.
67/021	ATM (Manned and Unattended) EREP Pass No. 35 M071/M073, M092, M093, M151 T003, S073, S183 ² VABD, PRD, CSM spectrometer readings Contamination observation and photos ED61/62 Science Demonstration ¹	1) Demonstration of orbital mechanics. 2) DAC camera failed. General: a. Second AM tape recorder replaced. b. Trim burn. c. TV of Science Demonstration. d. CMG 2 anomaly.
68/022	ATM (Manned and Unattended) EREP Pass No. 37 ¹ M071/M073, M092, M093 T003, S073, M487, T053 VABD, PRD, CSM spectrometer readings Blood flow in limbs measurements on Science Pilot	1) EREP Pass No. 36 cancelled due to CMG 2 anomaly. General: a. H Alpha 1 thermal shield door failed to close normally. b. H Alpha 1 frame remaining counter apparently failed. c. Severity of CMG 2 anomalies increasing.
69/023	ATM (Manned and Unattended) M071/M073, M092, M093 T002, T003, S063, S073, S183 ¹ VABD, PRD, CSM spectrometer readings Blood flow in limbs measurements on Commander Environmental microbiology sampling of SWS Science Demonstration ²	1) Unsuccessful malfunction procedure conducted. 2) Demonstration of fluid mechanics. General: a. CMG 2 anomaly continuous. b. ATM C&D coolant loop flow erratic. c. TV of Earth surface features and Science Demonstration.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
70/024	ATM (Manned and Unattended) M071/M073, M092, M093, M171 T003, T020, S019, S183 ¹ EREP ³ Pass No. 40 VABD, PRD, CSM spectrometer readings Environmental microbiology samples from crew. Water loss measurements Science Demonstrations ²	1) UV photos obtained with S019 camera. 2) Demonstration of fluid mechanics and thin liquid films. 3) Earth Terrain Camera used: General: a. CMG 2 anomaly continued. b. TV of Sciences Demonstrations and T020.
71/025	ATM (Manned and Unattended) EREP ⁴ Pass No. 41 M071/M073, M092, M093, M171, M074 ¹ T003, S183 ² , S019, S063, S201K, M487 VABD, PRD, CSM spectrometer readings Science Demonstration ³	1) Calibration of both SMMDs. 2) UV photos obtained with S019 camera. 3) Demonstration of silver crystals. 4) EREP tape recorder tape motion light flickered. General: a. Object reported floating inside TV monitor. b. H-Alpha 1 door failed to open. c. CMG 2 anomaly continued. d. TV of EREP instruments.
72/026	ATM (Manned and Unattended) EREP ¹ Pass No. 42 M071/M073 T003 S201 ² VABD, PRD, CSM spectrometer readings Science Demonstrations ³ , Off duty	1) EREP tape recorder tape motion light flickered. Earth Terrain Camera used. 2) Photos of rocket exhaust trail. 3) Gyroscope and fluid mechanics. General: a. CMG 2 anomaly continued. b. Secondary FSS wedge angles went to zero. c. TV of Science Demonstration.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
73/027	ATM ¹ (Manned and Unattended) EREP ⁴ Pass Nos. 44 and 45 M071/M073, M092, M093, M171, M131 ² , M133 Stereo photos M516, T053, S063K, S183 Malf VABD, PRD, CSM spectrometer readings ED61/ED62 Science Demonstration ³	1) S056 film transporter hung up. 2) Only motion sensitivity portion performed. 3) Deposition of silver crystals. 4) S190A Malf light on Earth Terrain Camera used. General: a. Mark I exerciser broke. b. Radiation survey meter not reading. c. CMG 2 anomaly continued.
74/028	ATM ³ (Manned and Unattended) EREP ¹ Pass No. 46 M071/M073, M092, M093, M131 ² , M110, M151 Girth and Height Measurements and Crew Profile Photos, visual light flash S183, M487, S073, T003 VABD, PRD, CSM spectrometer readings	1) Earth Terrain Camera used. S190A malfunction lights. 2) Motion sensitivity test performed. 3) S056 film transport mechanism hung up. General: a. CMG 2 anomaly continued.
75/029	ATM ¹ (Manned and Unattended) EREP ² Pass No. 47 M071/M073, M092, M093, M131 ³ , M172 ⁴ , M151 S183, S063, T053, T003 VABD, PRD, CSM spectrometer readings	1) JOP-13 (Gamma Velorum) 2) S190A failed. Earth Terrain Camera used. 3) Spatial localization tests performed. 4) BMMD calibrated. General: a. ATM C&D coolant loop flow dropped to zero momentarily. b. CMG 2 recovered to nominal for approximately 5 hours. c. Rash reported on SPT.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
76/030	ATM (Manned and Unattended) EREP ⁴ Pass No. 48 M071/M073, M092, M093, M131 ¹ , M151 Stereo photos, girth and height measurements and profile photos, H ₂ O loss ² M487, T053, T003, S073, S019K, S233K VABD, PRD, CSM spectrometer readings Science Demonstration ³	1) Spatial localization tests performed. 2) Insensible water loss. 3) Human body momentum. 4) Earth Terrain Camera used. General: a. CMG 2 reverted to distress level. b. WMC H ₂ O heater element considered failed.
77/031	ATM (Manned and Unattended) EREP Pass No. 49 M071/M073 M487, S063, T003, S233 VABD, PRD, CSM spectrometer readings Off Duty	General: a. Shower blower drive motor for post-wash water collection inoperative. b. TV of press conference (live).
78/032	ATM ¹ (Manned and Unattended) EREP ² Pass No. 50 M071/M073, M171, M092, M093, M133, M151 S201, S201K, S233K, T003 VABD, PRD, CSM spectrometer readings Girth and height measurements and profile photos ED41, ED61/62	1) JOP-13 (Gamma Velorum) 2) S191 ready light not on. Earth Terrain Camera used. General: a. CMG 2 improved slightly. b. TV of ED41 and human body momentum. c. EREP closed out.
79/033	ATM ¹ (Manned and Unattended) M071/M073, M092, M093, M171, M151 S233K, T003 VABD, PRD, CSM spectrometer readings EVA preparations	1) ATM closed out. General: a. CMG 2 reverted to distressed condition. b. CBRM capacity tests. c. Entry minus 6 day checks.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Continued)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
80/034	ATM (Unattended) M071/M073, M151 M516, T025 ¹ , S020 ¹ , S228 ¹ , D024 ¹ , S230 ¹ , S233K VABD, PRD, CSM spectrometer readings EVA ²	1) Accomplished during EVA. 2) EVA activities: a. T025 and S020 photos. b. S228, S230, D024 samples retrieved. c. S052, S054, S056, S082A, S082B, H-Alpha 1 film retrieved. d. Zero-G fixture cover retrieved. e. Nikon and documentary photos. f. Parasol and sail samples retrieved. g. S149 deployed. h. EVA thermal curtain sample retrieved. General: a. SPT's PCU leaked during EVA. b. Condensate tank Delta P went to zero after EVA.
81/035	ATM (Unattended) M071/M073, M092, M131, M133 M479 ¹ , S233K, T003 VABD, PRD, CSM spectrometer readings Environmental microbiology Anthropomorphic measurements Visual light flashes	1) Water quench system did not function properly. General: a. TV of M479. b. Condensate system malfunction procedures. c. CBRM capacity tests.
82/036	ATM (Unattended) M071/M073, M133, M092, M093, M171, M110 T003, M479 VABD, PRD, CSM spectrometer readings CO monitor Day 82 transfers, stowage	General: a. CBRM & AM battery capacity tests. b. AM primary coolant loop turned off.

TABLE 3. EXPERIMENTS/SYSTEMS OPERATIONS (Concluded)

MISSION DAY/ DAY OF YEAR	SIGNIFICANT EVENTS/ EXPERIMENT OPERATIONS/ CREW ACTIVITIES	REMARKS
83/037	ATM (Unattended) M071/M073, M092, M093, M171, M133 M487 VABD, PRD, CSM spectrometer readings Trim Burn Deactivation	General: a. Problem reported with placing urine trays in urine return container. b. CBRM capacity tests.
84/038	ATM (Unattended) M071/M073 Deactivation, CSM stowage	General: MD 84 was only 9 hour workday.
85/039	ATM (Unattended) ¹ M071/M073 OWS closeout, suit donning CSM power up ² Deorbit, splashdown	General: 1. Unattended operations terminated. 2. Leak in CM RCS system 2.

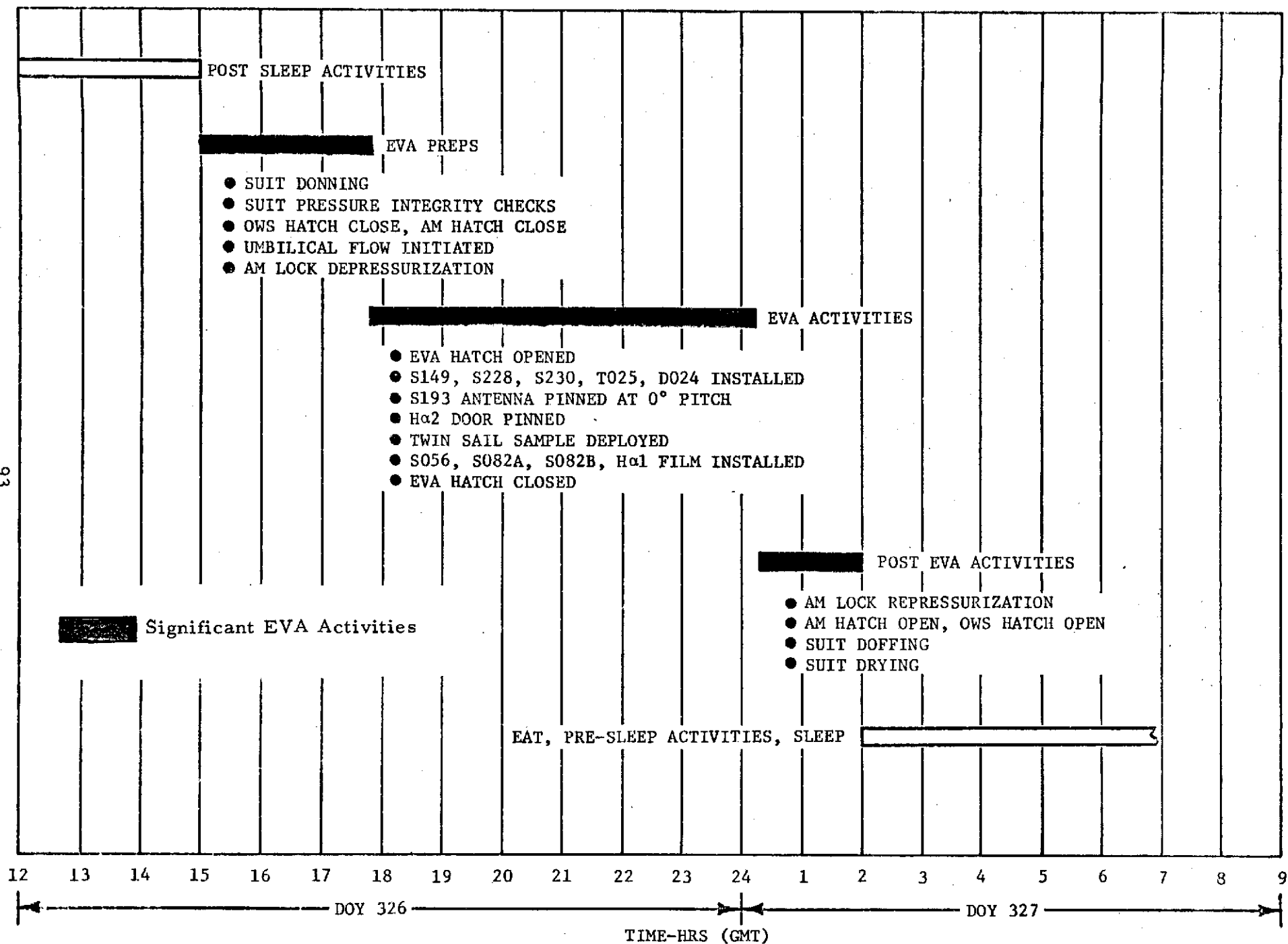


FIGURE 28. EVA NO. 1 - ACTUAL

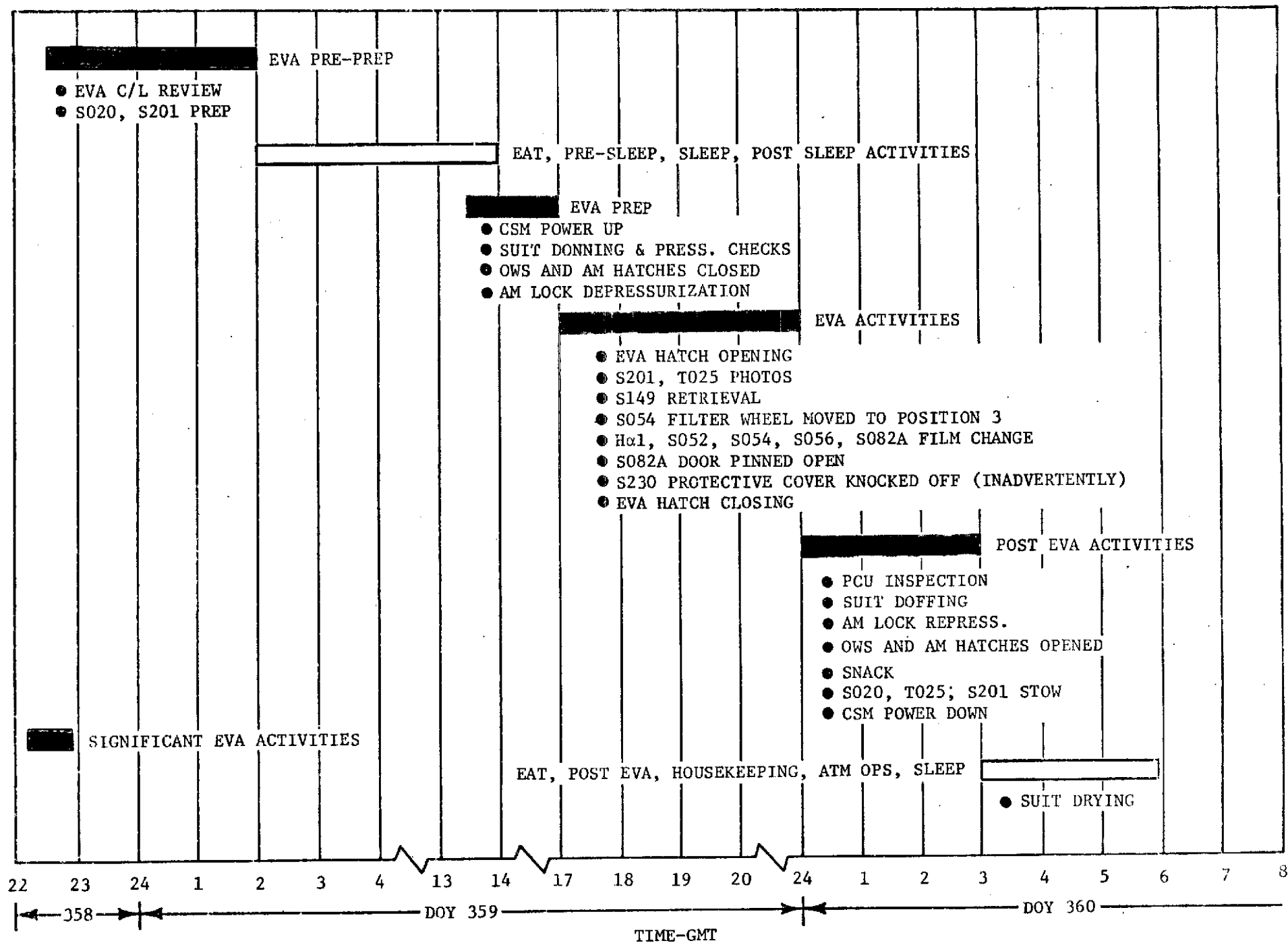


FIGURE 29. EVA NO. 2 - ACTUAL

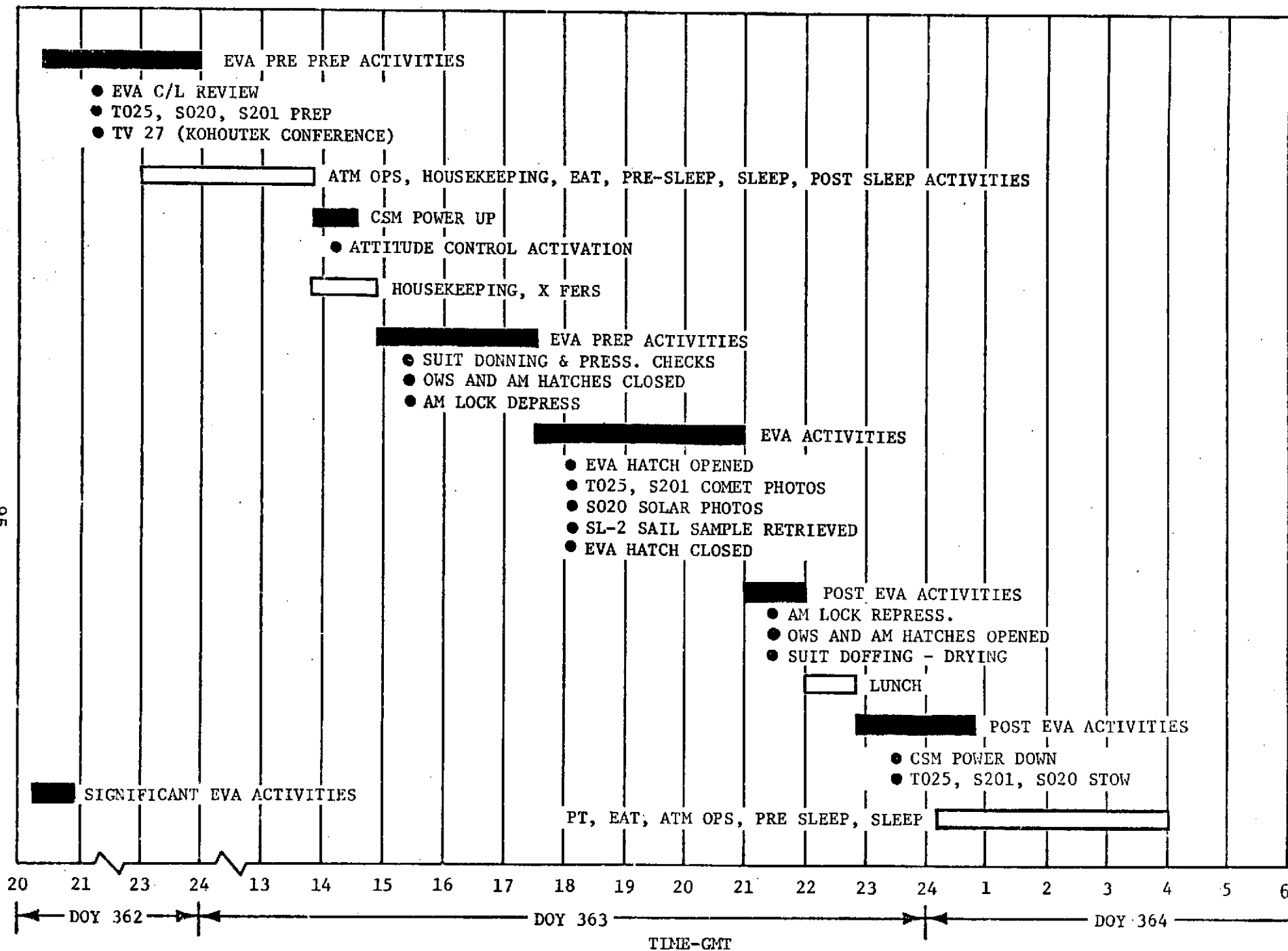


FIGURE 30. EVA NO. 3 - ACTUAL

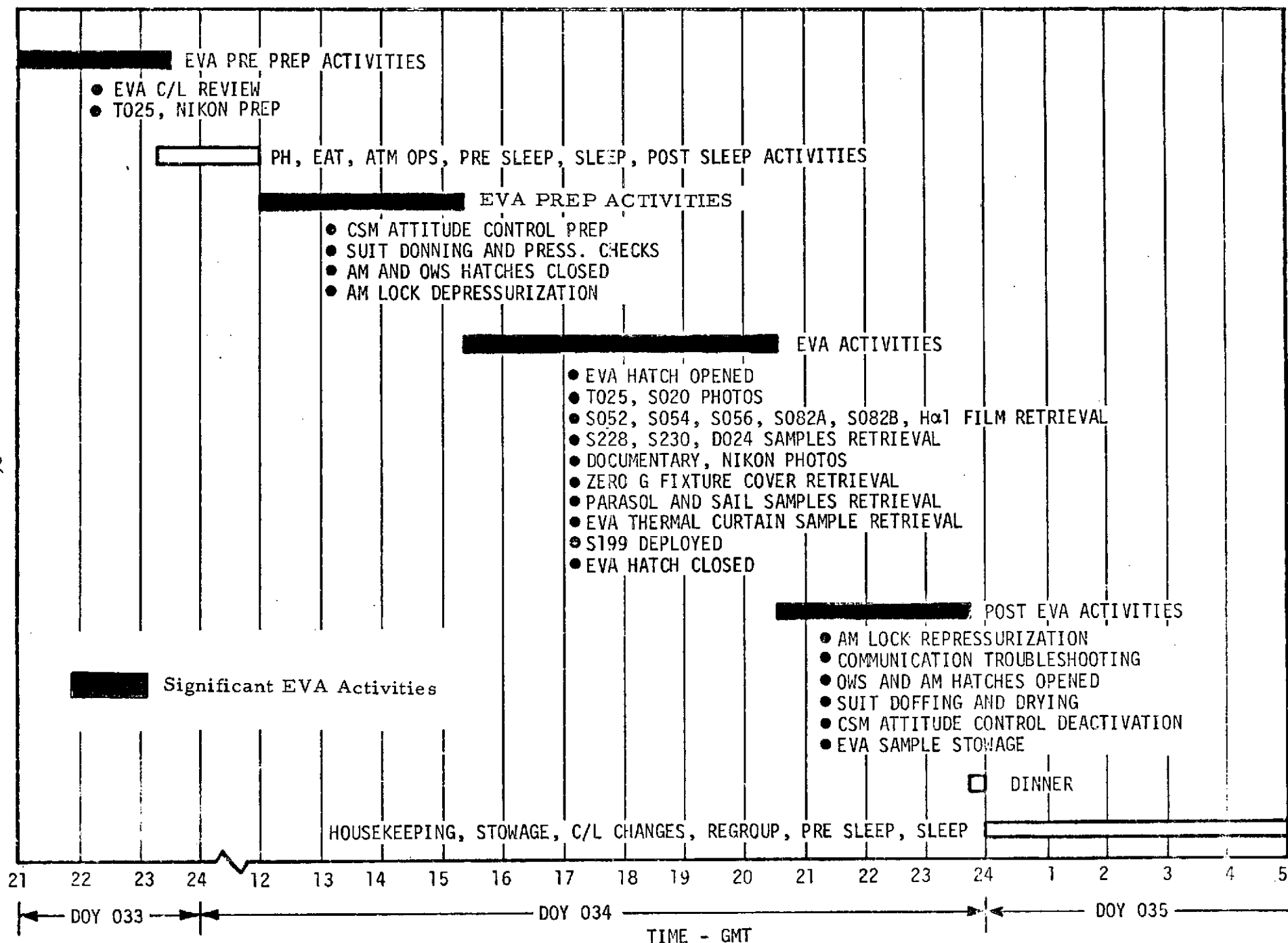


FIGURE 31. EVA NO. 4 - ACTUAL

SL-4 DEACTIVATION

In general, the SL-4 deactivation went as planned. The only problem arose when the urine trays would not fit easily into the urine return container. This problem was solved with no significant impact on the urine samples. A great amount of time was dedicated to film and tape transfer and stowage. Because no plans were made for a reactivation, some systems which must be operated to maintain the vehicle in working condition were deactivated and many deactivation items performed on previous Skylab missions were excluded from the SL-4 deactivation sequence. Those tasks not performed were as follows:

- a. WMC filter replacement
- b. WMC vent filter replacement
- c. Solids traps replacement
- d. Trash bag collection
- e. S190 window protector stowage
- f. Urine separator flush
- g. Urine separator filter replacement
- h. Plenum bag stowage
- i. Caution cartridge deactivation
- j. Sleep restraint removal
- k. General housekeeping tasks

The EVA hatch was configured to be opened from the outside in case a revisit by a vehicle not equipped with the proper docking system is required. Also, a "time capsule" consisting of various items in a bag was left just inside the MDA hatch tied to the ATM grid.

During entry preparations a leak developed in the command module reaction control system 2 upstream of the propellant isolation valves. The entry maneuvers were completed using reaction control system 1.

The actual SL-4 deactivation sequence is shown in Figure 32.

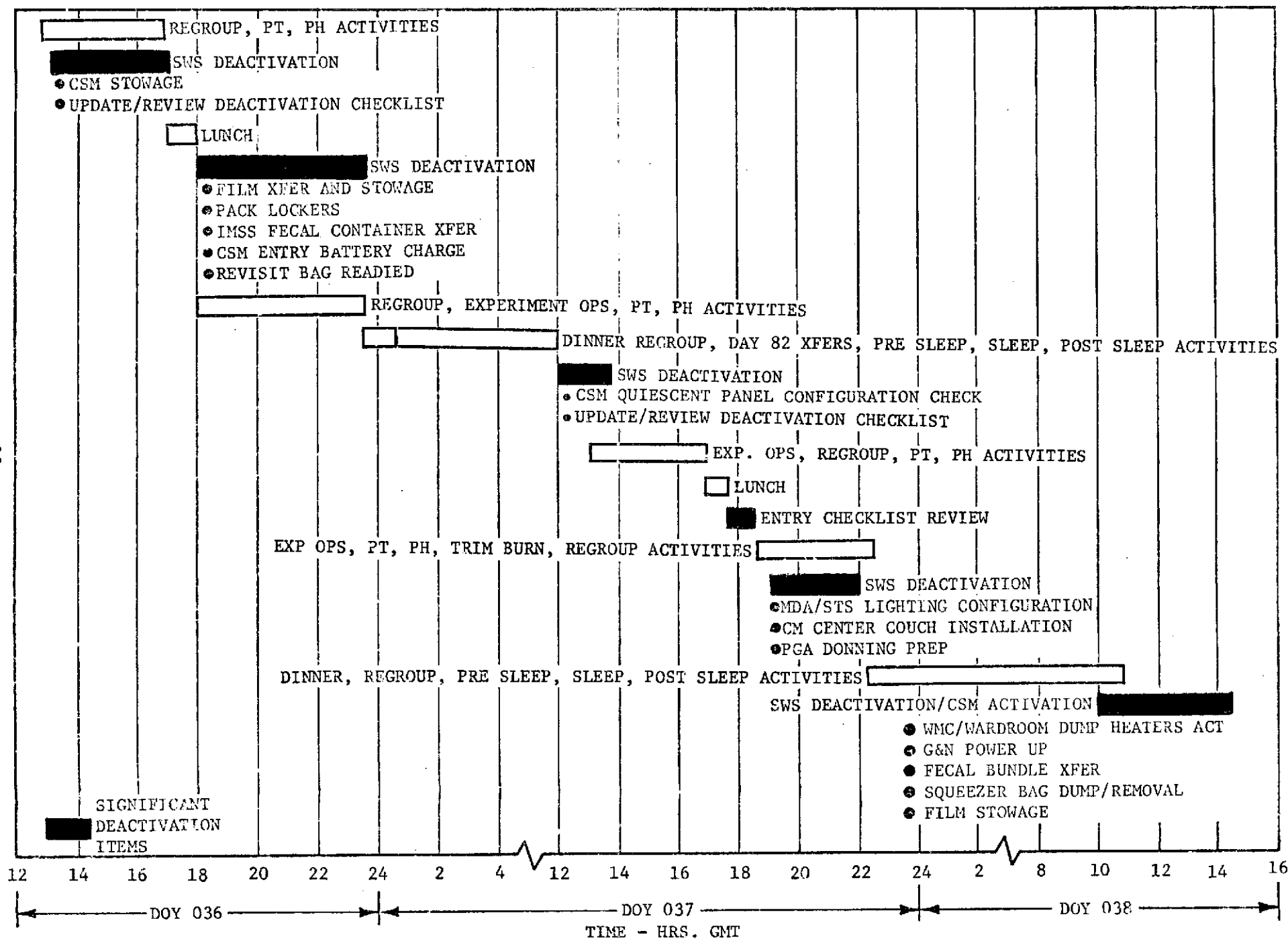


FIGURE 32. SL-4 DEACTIVATION - ACTUAL

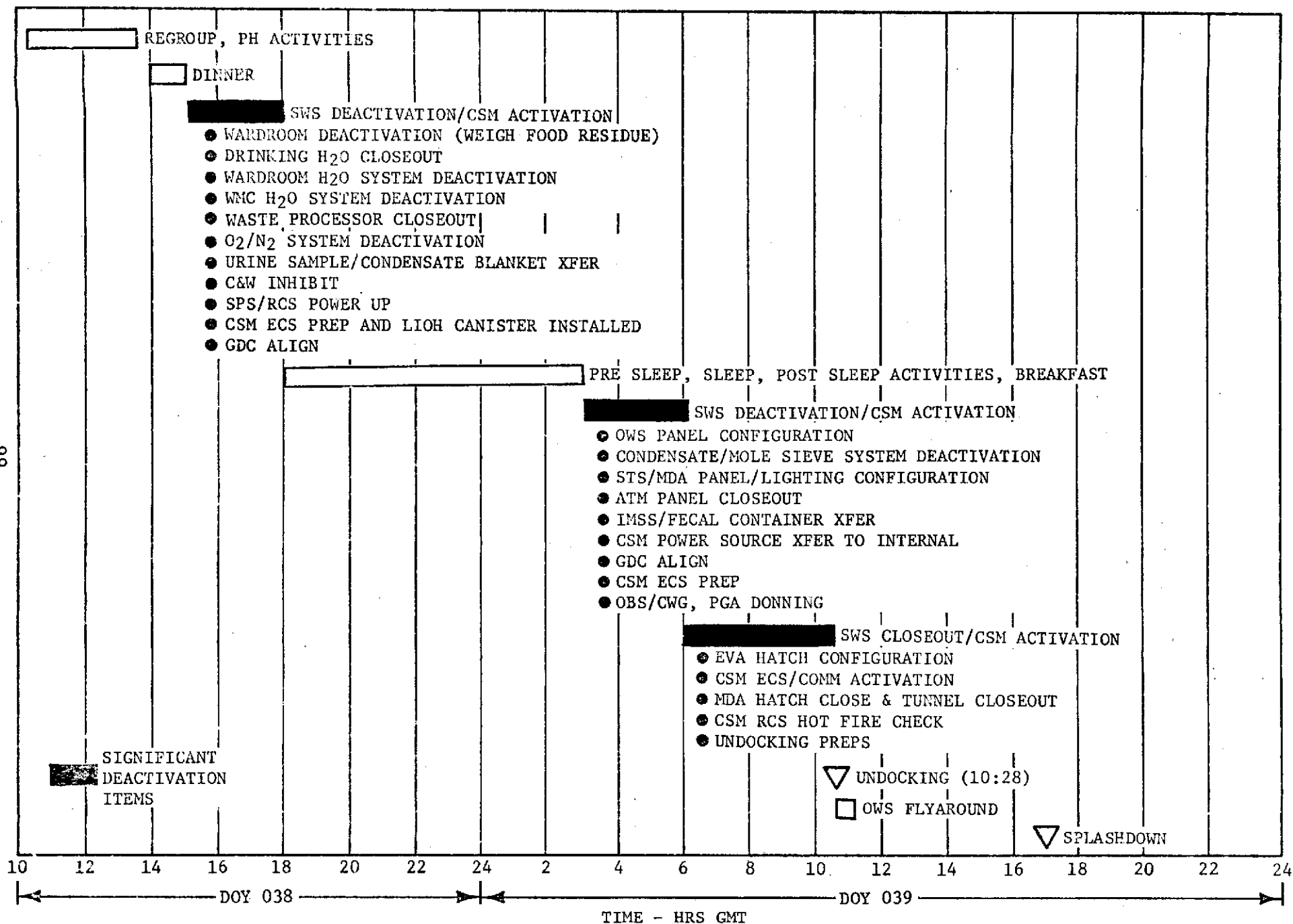


FIGURE 32. SL-4 DEACTIVATION - ACTUAL (Concluded)

POST SL-4 SYSTEMS ENGINEERING TESTS

End of mission engineering testing began shortly after CSM undocking and continued for 32 hours before the Skylab vehicle was completely powered down. The engineering tests conducted were as follows:

- 1) CMG 1 spin up
- 2) AM PCG capacity tests
- 3) Secondary RSS operation and an attempt to get both the primary and secondary loop radiator bypass valves returned to normal mode of operation.
- 4) Rack rate gyro power up to provide data on the heater control circuits.
- 5) AM secondary coolant loop troubleshooting
- 6) CBRM power share tests
- 7) Operation of the secondary pulse code modulation/digital data acquisition system
- 8) Operation of the secondary data storage interface unit
- 9) AM transmitter A 10-W test
- 10) Memory load unit test using the program tape
- 11) 72KBPS uplink test

Significant findings resulting from the tests were as follows:

- 1) CMG 1 wheel did not achieve appreciable speed; wheel speed determinations of CMGs 2 and 3 were made during their power down.
- 2) Cycling of the radiator bypass valves in both the primary and secondary RSS loops failed to return the loops to their original performance.
- 3) The rack rate gyros which exhibited excessive drift rates earlier continued to do so.

4) Pump A in the AM secondary coolant loop was operational but inverter #1 had failed.

5) AM 10-watt transmitter A failed and did not recover.

6) Tests on systems which had not previously been used showed the systems to be fully operational.

7) AM battery capacity tests revealed that cycle life degradation was lower than predicted.

Figure 33 presents the sequence of engineering tests and significant unmanned deactivation items.

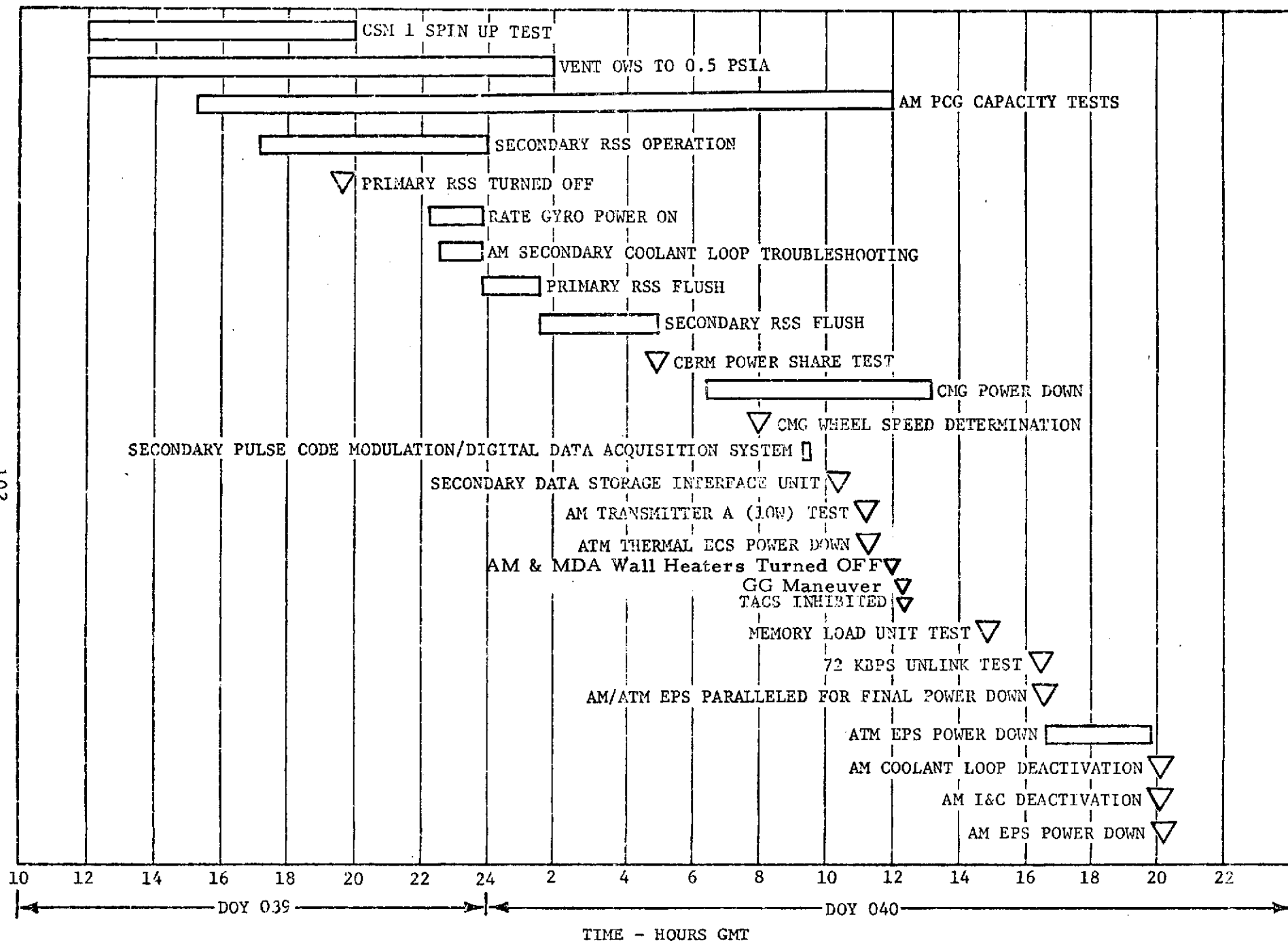


FIGURE 33. POST SL-4 SYSTEMS ENGINEERING TESTS

APPROVAL

MSFC SKYLAB MISSION SEQUENCE EVALUATION

By J. D. Hoverkamp

The information in this report has been reviewed for security classification. Review of any information concerning Department of Defense or Atomic Energy Commission programs has been made by the MSFC Security Classification Officer. This report, in its entirety, has been determined to be unclassified.

This document has also been reviewed and approved for technical accuracy.



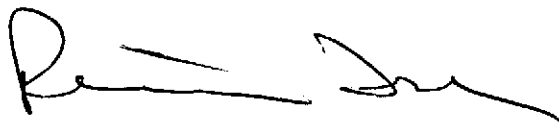
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Integration Division



A. A. McCool
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JUN 17 1974